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AUTHORITY

AFMC ltr, 19 Feb 2002

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HEADQUARTERS
AIR FORCE FLIGHT TEST CENTER
EDWARDS AIR FORCE BASE
CALIFORNIA

FTDTP 23 Aug 54

SUBJECT: Revision of Fig. 4 in AFTR No. AFFTC 54-16
By 1/Lt Donald H. Wooley

TO: All Concerned

Investigation of additional data disclosed that the attached Maximum Level Flight Airspeed curve should replace the corresponding curve on page 6 in Appendix I of AF Technical Report No. AFFTC 54-16 to more accurately represent the capabilities of the F-86F aircraft with PTI modifications. The Maximum Calibrated Airspeed Chart on page three of the body of the above report should therefore be changed to read 258 knots with PTI and 252 knots without PTI at 45,000 feet due to this revision. The corresponding corrected test data sheet from page 12 in Appendix III is included.

FOR THE COMMANDER:

H. A. HANES
Colonel, USAF
Director, Flight Test
and Development

Incls
as shown

54AA 58025 54-D-4131

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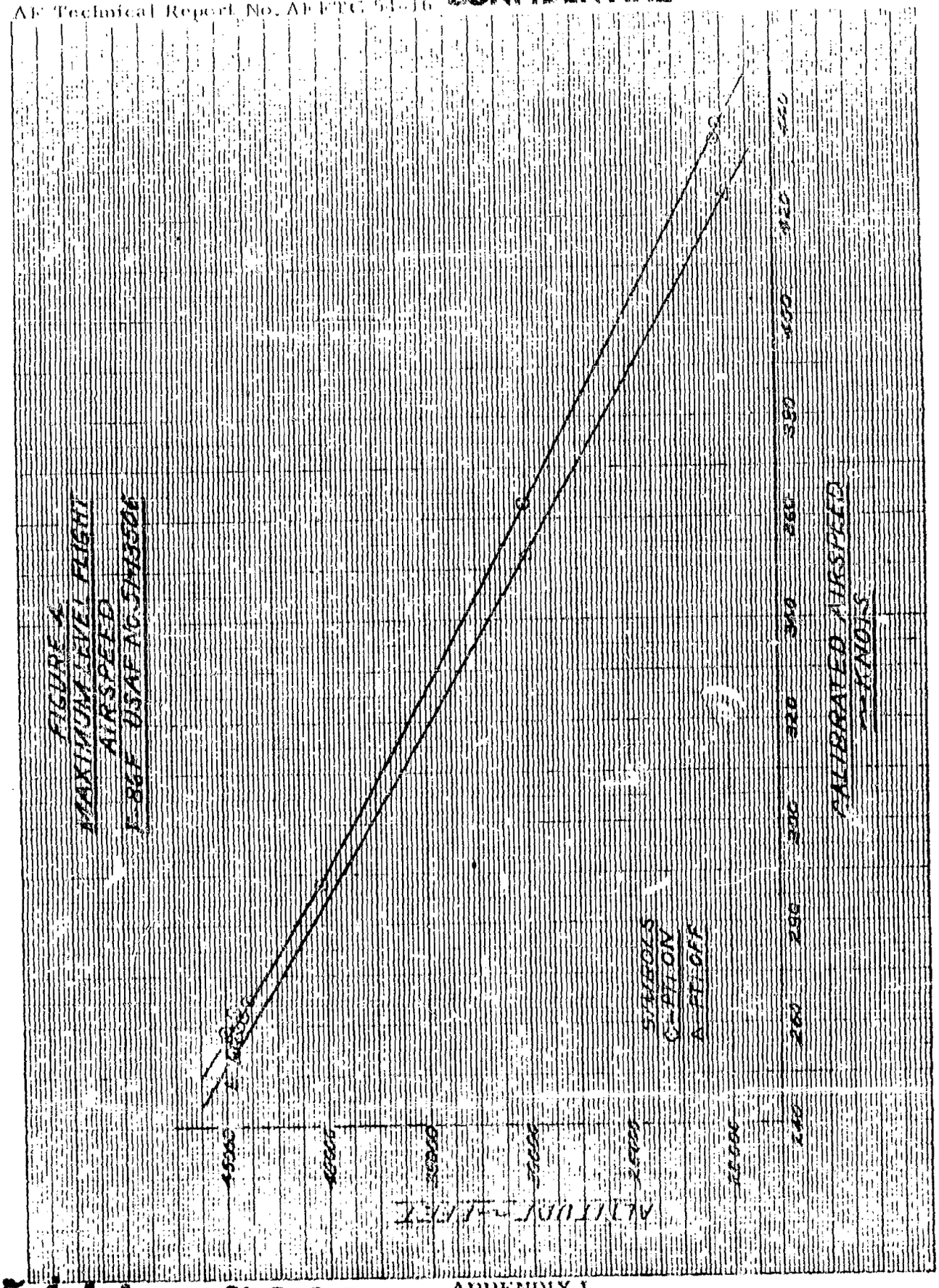


FIGURE 4
MAXIMUM LEVEL FLIGHT
AIRSPEED
F-86F USAF AC 51-13501
CALIBRATED AIRSPEED
KNOTS
SYMBOLS
C-ELEVON
A-FLAPS OFF
PRESSURE ALTITUDE

TEST DATA CORRECTED FOR INSTRUMENT ERROR

F-86F, USAF No. 51-13506

Test	ACCELERATION								
Configuration	CLEAN								
Flight No. – RUN No.	17 1	17 4	17 4	17 4					
Time – Min	1.28	1.88	1.49	2.09					
IAS – knots	356	364.5	363.5	364.5					
Altitude – ft	29840	29780	29780	29780					
Air Temp – °C	-7	-7	-3	-1					
RPM	7740	7740	7740	7740					
Ex. Gas Temp – °C	1000	1000	1000	990					
Ex. Gas Press – "Hg									
Fuel Used – gal	302	302	306	308					
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	MAXIMUM LEVEL FLIGHT AIRSPEED								
Configuration	CLEAN – WITH PTL								
Flight No.	1	5	5	5	8	9	14	17	17
Time – Min									
IAS – knots	[illegible]	[illegible]	251	255	[illegible]	256	252	[illegible]	364
Altitude – ft	44540	20000	20180	44520	44810	44900	44580	19960	29780
Air Temp – °C	-28	+18	-27	-27	-26	-36	-36	+27	-1
RPM	7120	7770	7700	7800	7760	7750	7610	7800	7780
Ex. Gas Temp – °C	1010	945	900	760	775	945	925	755	990
Ex. Gas Press – "Hg									
Fuel Used – gal									
Fuel Flow – gal/hr									
Fuel Press – PSI									

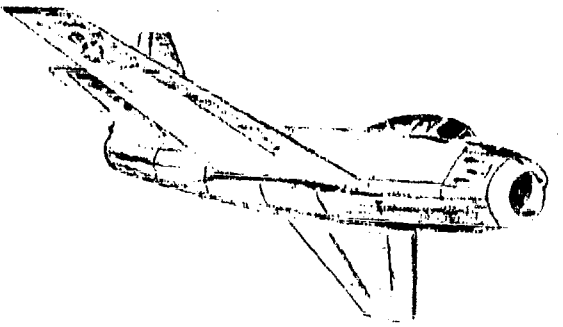
Test	MAXIMUM LEVEL FLIGHT AIRSPEED								
Configuration	CLEAN – WITHOUT PTL								
Flight No.	14	17	17		8	14			
Time – Min									
IAS – knots	254	424	350		249	258			
Altitude – ft	44320	17880	29700		44780	44540			
Air Temp – °C	-35	+26	-2		-36	-31			
RPM	7650	7630	7430		7740	7540			
Ex. Gas Temp – °C	650	650	590		650	640			
Ex. Gas Press – "Hg									
Fuel Used – gal									
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	MAXIMUM LEVEL FLIGHT AIRSPEED								
Configuration	CLEAN – WITH PTL								
Flight No.	5	9	12	14	14				
Time – Min									
IAS – knots	255	261	363	257	259				
Altitude – ft	44800	44400	44100	44520	44700				
Air Temp – °C	-26	-34	-30	-35	-35				
RPM	7740	7760	7740	7610	7630				
Ex. Gas Temp – °C	860	735	745	725	975				
Ex. Gas Press – "Hg									
Fuel Used – gal									
Fuel Flow – gal/hr									
Fuel Press – PSI									

APPENDIX III

AIR FORCE FLIGHT TEST CENTER

AIR RESEARCH & DEVELOPMENT COMMAND



AF TECHNICAL REPORT NO. AFFTC 54-16

PHASE II PERFORMANCE AND SERVICEABILITY TESTS OF THE F-86F AIRPLANE USAF NO 51-13506 WITH PRE-TURBINE MODIFICATIONS

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FLIGHT TEST ENGINEER

STUART R. CHILDS, MAJOR, USAF
TEST PILOT

JUNE 1954

EDWARDS AIR FORCE BASE
CALIFORNIA

AF Technical Report No. AFFTC-54-10
June 1954

PHASE II PERFORMANCE AND SERVICEABILITY TESTS OF THE F-86F AIRPLANE USAF No. 51-13506 WITH PRE-TURBINE MODIFICATIONS

DONALD H. WOOLEY, 1/Lt, USAF
Flight Test Engineer

STUART R. CHILDS, Major, USAF
Test Pilot

UNITED STATES AIR FORCE
AIR RESEARCH AND DEVELOPMENT COMMAND
AIR FORCE FLIGHT TEST CENTER
EDWARDS, CALIFORNIA

PUBLICATION REVIEW

This Report has been reviewed and is approved

H. A. HANES
Colonel, USAF
Director, Flight Test
and Development

J. S. HOLTONER
Brigadier General, USAF
Commander

ABSTRACT

The increases in climb and level flight performance of the F-86F with Pre-Turbine injection modifications substantially improve the value of this aircraft as a fighter-interceptor; however, the problems of turbine blade failure and nozzle binding must be overcome before the unit can be used operationally.

TABLE OF CONTENTS

F-86F AIRPLANE (USAF No. 51-13506)

A. INTRODUCTION

1. Project Objective

Flight tests were conducted on the F-86F airplane, USAF No. 51-13506, with pre-turbine injection modifications to determine the state of development and serviceability of the installation and to obtain limited performance data.

2. Project Authority

The Phase II performance and serviceability tests were conducted under the authority of the Commander, AFFTC as requested by Air Research and Development Command TWX No. RDTOTP 4-22-E.

3. Project History

a. Seventeen flights were made between 21 April and 5 May, 1954 totaling twelve hours of which two hours and twenty-eight minutes were flown with PTI in operation. Four additional flights were made between 6 May and 26 May, 1954 by other pilots of the Air Force Flight Test Center for additional qualitative evaluation of the airplane.

b. The airplane was instrumented and maintained by the General Electric Company facility at the Air Force Flight Test Center and was returned to them under bailment agreement upon completion of the Air Force flight evaluation program. The flight test program was completed 26 May, 1954.

c. Preliminary reports of these tests were submitted to the Commander, Wright Air Development Center on 3 May and 17 May, 1954. A detailed maintenance report was submitted to the same Hdq, 30 June 1954. These are included as Appendix IV.

4. Description of the Aircraft

a. The airplane flown is a standard F-86F with 6" x 3" wing leading edges. The only modification to the exterior configuration is the addition of several air vents on the aft fuselage section to provide better cooling.

b. The engine is a standard J47-GE-27 fitted with a Stellite tailpipe, variable nozzle and necessary controls and equipment to inject standard engine fuel through the turbine casing forward of the turbine wheel. The fuel is injected at four equally spaced points around the periphery of the turbine casing. The rate of flow of PTI fuel is controlled by compressor inlet pressure and a ground adjustment is provided to allow various PTI fuel schedules to be set up. The nozzle consists of four 90 degree flat plate segments which provide a near perfect circular opening throughout the nozzle area range. The nozzle is modulated by a Solar Microjet unit which senses the ratio between compressor discharge pressure and turbine discharge pressure. This unit operates by receiving an electrical signal of sufficient magnitude to send a pulse to the actuator motor to jog the nozzle to a slightly more open or more closed position until an electrical balance is obtained.

c. PTI is placed in operation by moving the throttle outboard while in the full throttle position. This action closes a switch and PTI will remain in operation until the "cage" button on the throttle is depressed or until the throttle is retarded sufficiently to cause an unbalance between PTI and main engine fuel flows.

d. The airplane was tested in the clean configuration only and all curves in Appendix I are of this configuration.

e. The manufacturer limits PTI operation of this installation to an altitude range of 20,000 to 45,000 feet because of engine structural limitations.

B. TEST RESULTS

1. Climb

a. Check climbs were flown using two climb schedules. One schedule noted as schedule "B" in the climb curves in Appendix I was taken from Air Force Technical Report No. AFFTC 54-10 on Phase IV testing of the standard F-86F. This schedule is the recommended best climb schedule for the F-86F. From this schedule and estimated 40% thrust augmentation from PTI a theoretical best climb schedule was calculated and designated as schedule "A" in Appendix I. Since this PTI installation is limited to an altitude range of 20,000 to 45,000 feet, schedule "A" is an attempt to stay on the Phase IV schedule up to slightly below 20,000 feet; and then while lighting PTI, accelerating to the theoretical or proposed schedule for the remainder of the climb to 45,000 feet. The limited time available for tests and the somewhat arbitrary nature of the operating limits placed upon the unit at the present state of development precluded the developing of data reduction methods for reducing this data to standard day conditions. The data presented are, therefore, test data corrected for instrument error. Airspeed and altimeter position error corrections used are those established for the standard airspeed system of the F-86F airplane during Phase IV testing. The applicability of these curves was established by checks against an F-86A pacer aircraft. A summary of climb performance is presented below:

TIME TO CLIMB

Altitude ft.	Without PTI Sched. B - Min.	With PTI Sched. A - Min.	With PTI Sched. B - Min.
20,000 to 45,000	12.1	4.4	4.6

RATE OF CLIMB

Altitude ft.	Without PTI Sched. B - ft/min	With PTI Sched. A - ft/min	With PTI Sched. B -ft/min
30,000	3,000	7,400	7,000
45,000	1,000	3,300	4,200

b. PTI operation during all climbs was satisfactory with slight combustion instability for a short period on a few of the climbs. This condition was detected by the pilot but apparently did not affect climb performance. Although the manufacturer limits the present PTI configuration to 45,000 feet a maximum altitude attempt was made to explore and substantiate this limit. A maximum altitude

of 53,760 feet was established but loss of a turbine blade terminated the flight. At this altitude the aircraft is capable of a 600 ft/min rate of climb.

2. Level Flight

a. Level flight speed versus power data were obtained at 20,000, 30,000 and 45,000 feet. Considerable difficulty was encountered in obtaining this data due to nozzle binding. A nozzle with surface hardened segments was installed which alleviated this condition considerably but nozzle sticking was still present to a limited degree on subsequent flights. This nozzle sticking was apparent only in level flight at altitude and was not apparent during any of the climbs.

b. Level flight data are presented only as time histories of level flight accelerations and maximum level flight airspeed. RPM is not directly representative of engine performance with this installation. PTI fuel is injected upstream of the turbine wheel and burns aft of the turbine wheel. The burning of this additional fuel increases the pressure on the back side of the turbine blades and tends to decrease engine RPM. Additional fuel is scheduled to the main engine to prevent this decrease in RPM while on PTI operation. RPM is therefore dependent upon this balance of fuel scheduled between the main engine and PTI. Nozzle position also affects engine RPM and since it cannot readily be established that the nozzle was completely free from sticking during apparently satisfactory operation, nozzle binding may have adverse affects on the data. Since RPM is affected by the two conditions stated it is not a reliable criteria of engine thrust. Maximum level flight airspeed data were obtained with and without PTI within the 20,000 to 45,000 feet range to which PTI operation is limited. These instrument corrected data are presented in Figure 4, Appendix I and are listed in the summary below:

MAXIMUM CALIBRATED AIRSPEED

Altitude ft.	Without PTI knots	With PTI knots
20,000	423	439
30,000	353	363
45,000	254	255

c. A comparison of acceleration runs at 20,000, 30,000 and 45,000 feet were made with and without PTI in operation. At 20,000 feet the time to accelerate from a CAS of 166 knots to 420 knots was reduced from 3.47 minutes without PTI to 1.5 minutes with PTI, at 30,000 feet an increase in CAS from 156 knots to 350 knots required 3.5 minutes dry and 1.72 minutes wet and at 45,000 feet from 210 knots to 254 knots the time required was 3.16 minutes compared to 1.0 minute. Time histories of these accelerations are presented as instrument corrected data in Figure 3 in Appendix I. The two accelerations made at each of the three altitudes were made as consecutive runs of the same flight.

3. Static Thrust Calibration

A ground static thrust calibration of the test engine was made on the Universal Thrust Stand of the Air Force Flight Test Center. Results of the test are presented in Figure 5, Appendix I.

C. CONCLUSIONS

1. It is concluded that the increase in performance of the F-86F due to the PTI installation is of such magnitude as to warrant further exploration of the system. The installation has sufficient merit to make it advisable for the Air Force to secure development test history on the system in order that definite operating limits and maintenance requirements may be established.

D. RECOMMENDATIONS

1. The AFFTC recommends that further developmental testing on the PTI installation be accomplished both by the contractor and by the Air Force. To insure representative operation more than one aircraft should be used for this testing.

APPENDIX I
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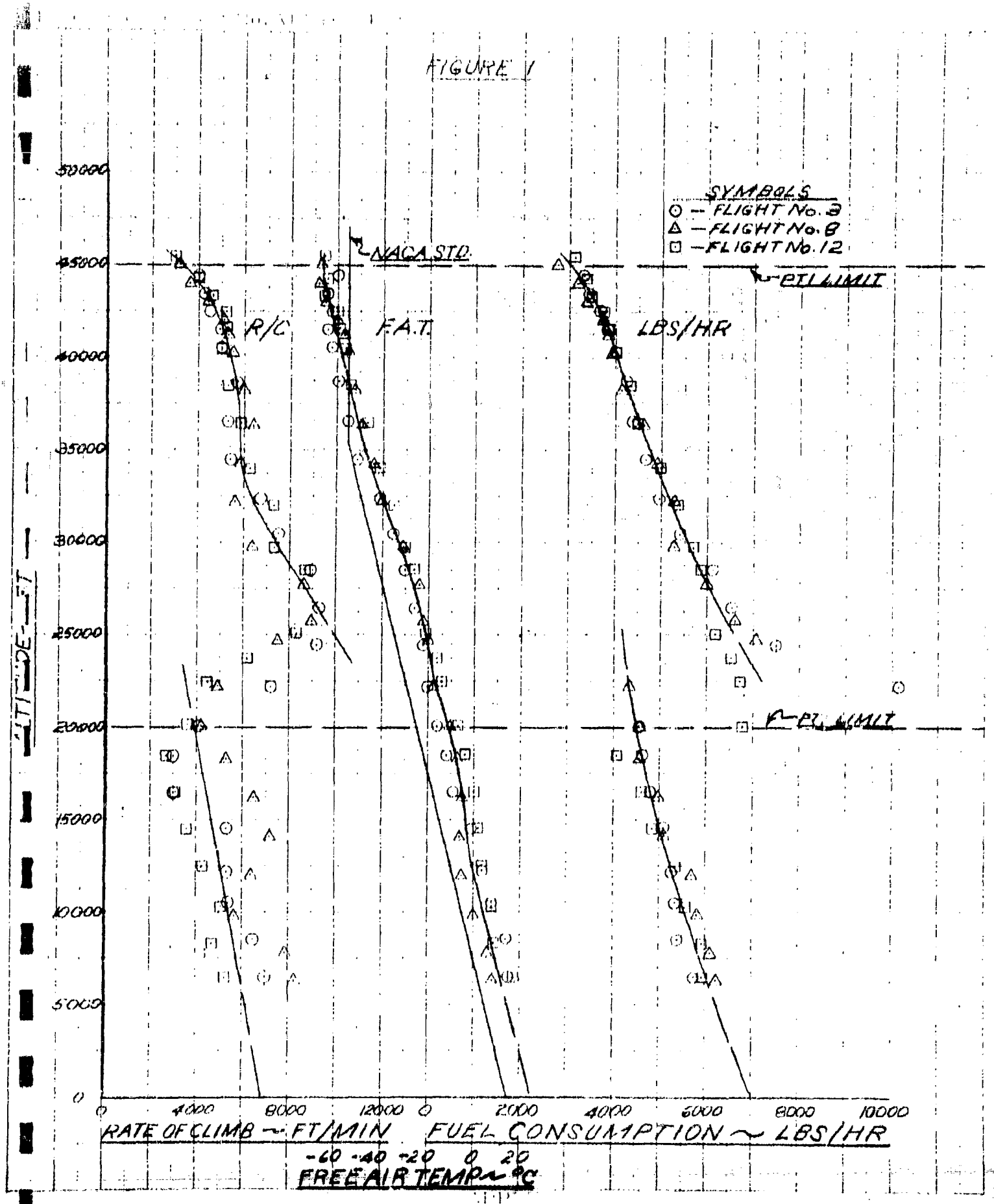
FIGURE 1


SYMBOLS
⊙ — FLIGHT No. 3
△ — FLIGHT No. 8
□ — FLIGHT No. 12
NACA STD.
R/C
F.A.T.
LBS/HR
P.I. LIMIT
F.P. LIMIT
ALTITUDE - FT
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
0
4000
8000
12000
0
2000
4000
6000
8000
10000
RATE OF CLIMB — FT/MIN
FUEL CONSUMPTION — LBS/HR
-60 -40 -20 0 20
FREE AIR TEMP — °C

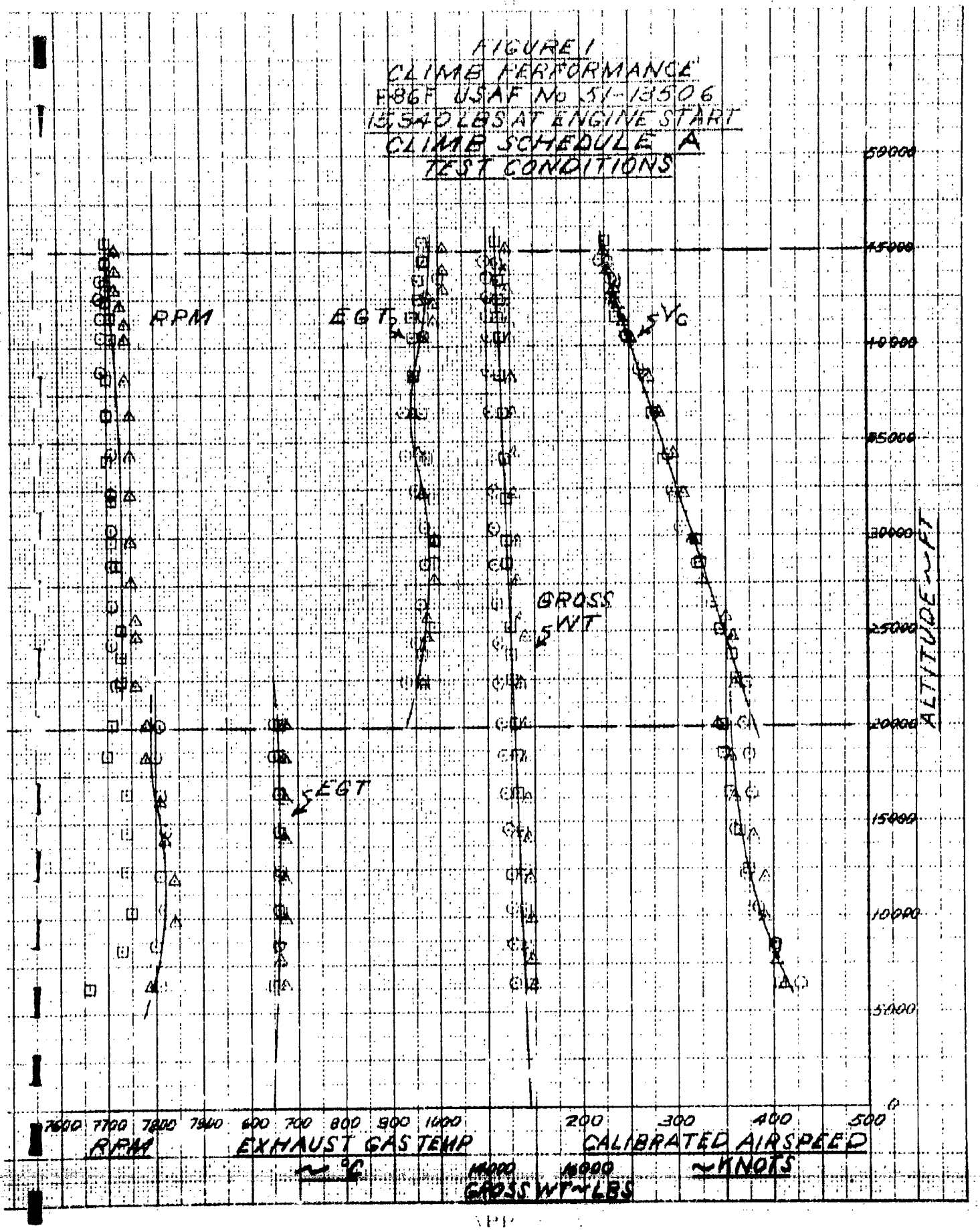


FIGURE I
CLIMB PERFORMANCE
F-86F USAF No 51-13506
15540 LBS AT ENGINE START
CLIMB SCHEDULE A
TEST CONDITIONS
RPM
EGT
GROSS WT
IAS
ALTITUDE-FT
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
7600 7700 7800 7900
RPM
600 700 800 900 1000
EXHAUST GAS TEMP
~°C
200 300 400 500
CALIBRATED AIRSPEED
~KNOTS
15000 16000
GROSS WT~LBS

FIGURE 2

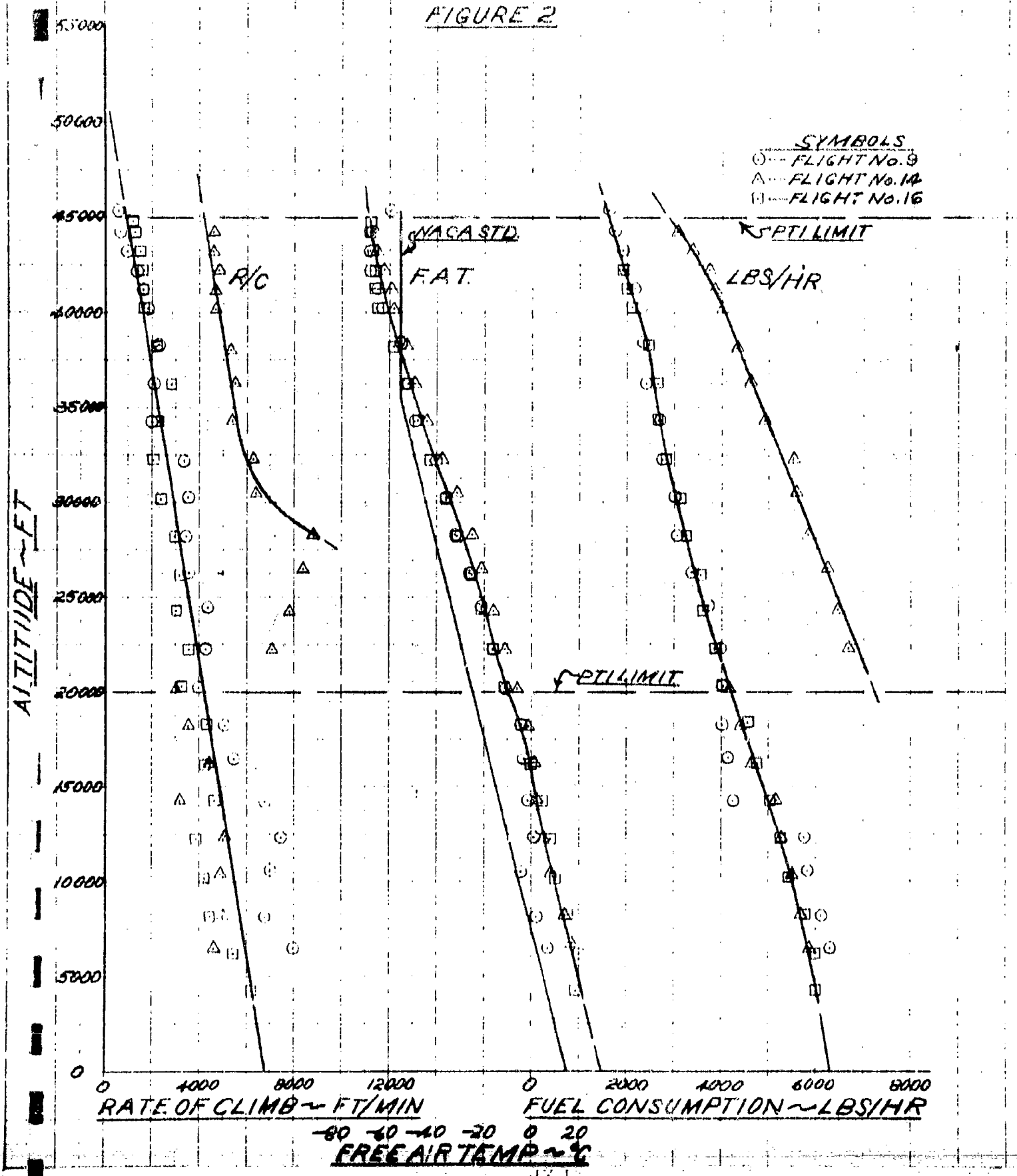

SYMBOLS
FLIGHT No. 9
FLIGHT No. 14
FLIGHT No. 16
R/C
NACA STD.
F.A.T.
PTI LIMIT
LBS/HR
PTI LIMIT
ALTITUDE ~ FT
55000
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
0
4000
8000
12000
0
2000
4000
6000
8000
RATE OF CLIMB ~ FT/MIN
FUEL CONSUMPTION ~ LBS/HR
-60
-40
-20
0
20
FREE AIR TEMP ~ °C

FIGURE 2
CLIMB PERFORMANCE
F-86F USAF No 51-13506
15,340 LBS AT ENGINE START
CLIMB SCHEDULE B
TEST CONDITIONS

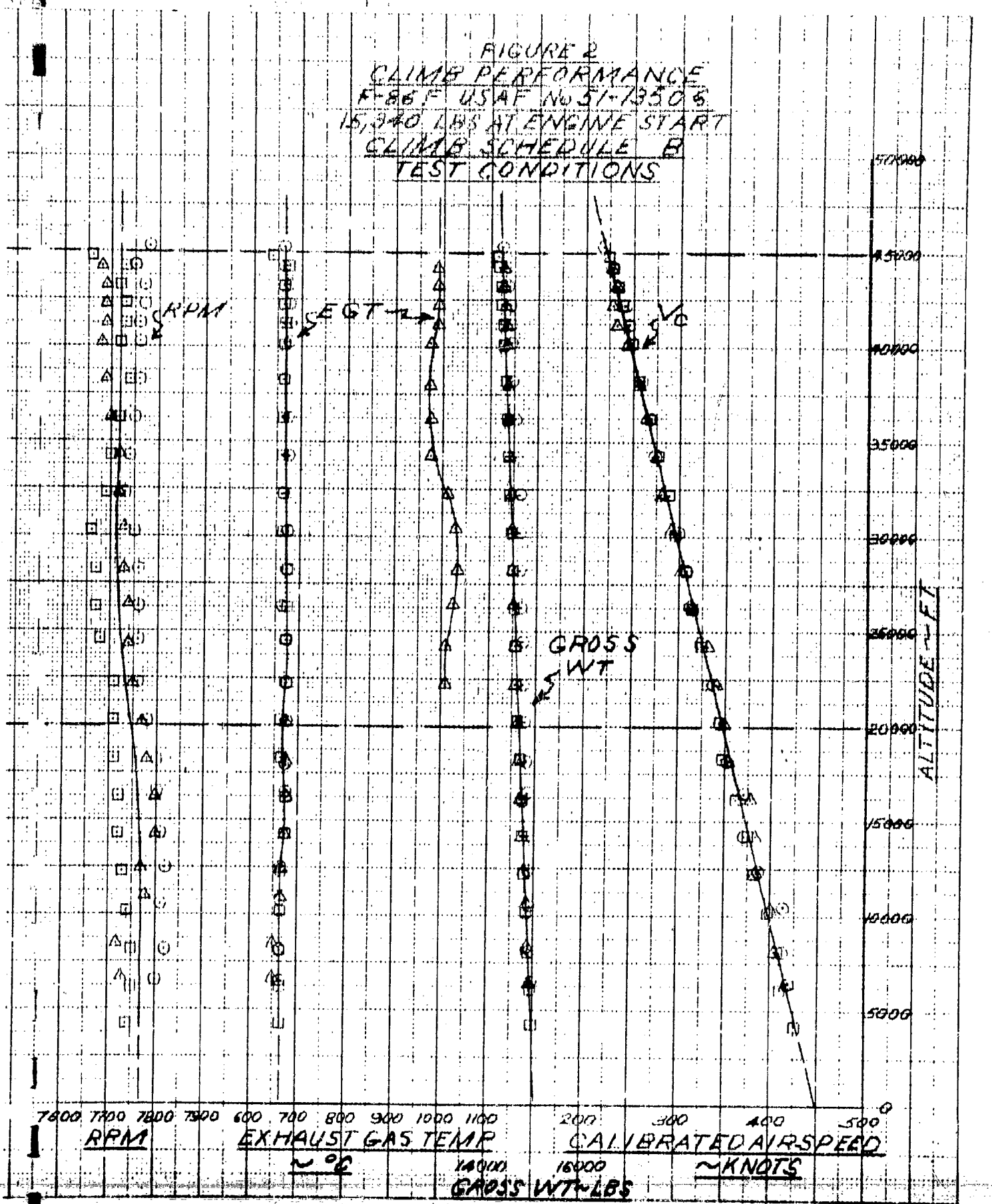


FIGURE 3
TIME HISTORY OF LEVEL FLIGHT
ACCELERATION
F-86F USAF No. 51-13506

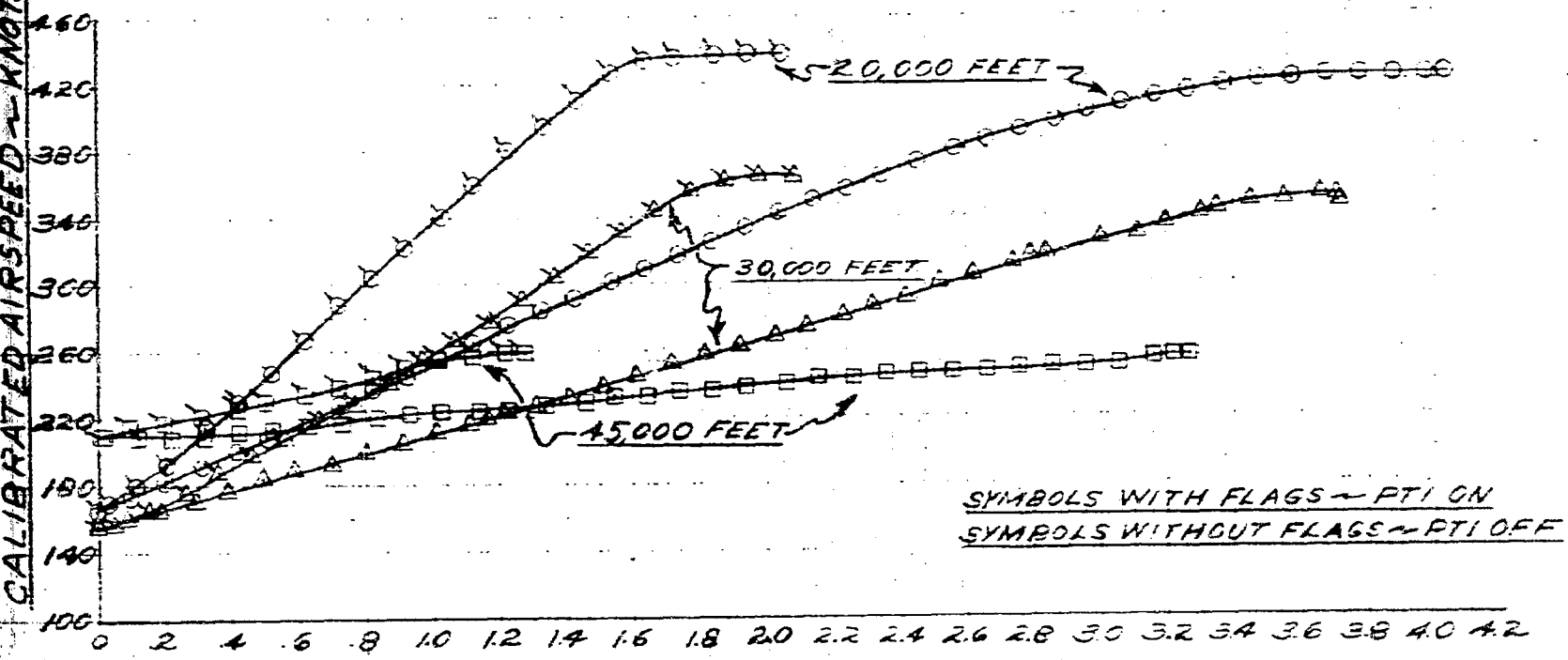


FIGURE 4
MAXIMUM LEVEL FLIGHT
AIRSPEED
F-86F USAF No 51-13506

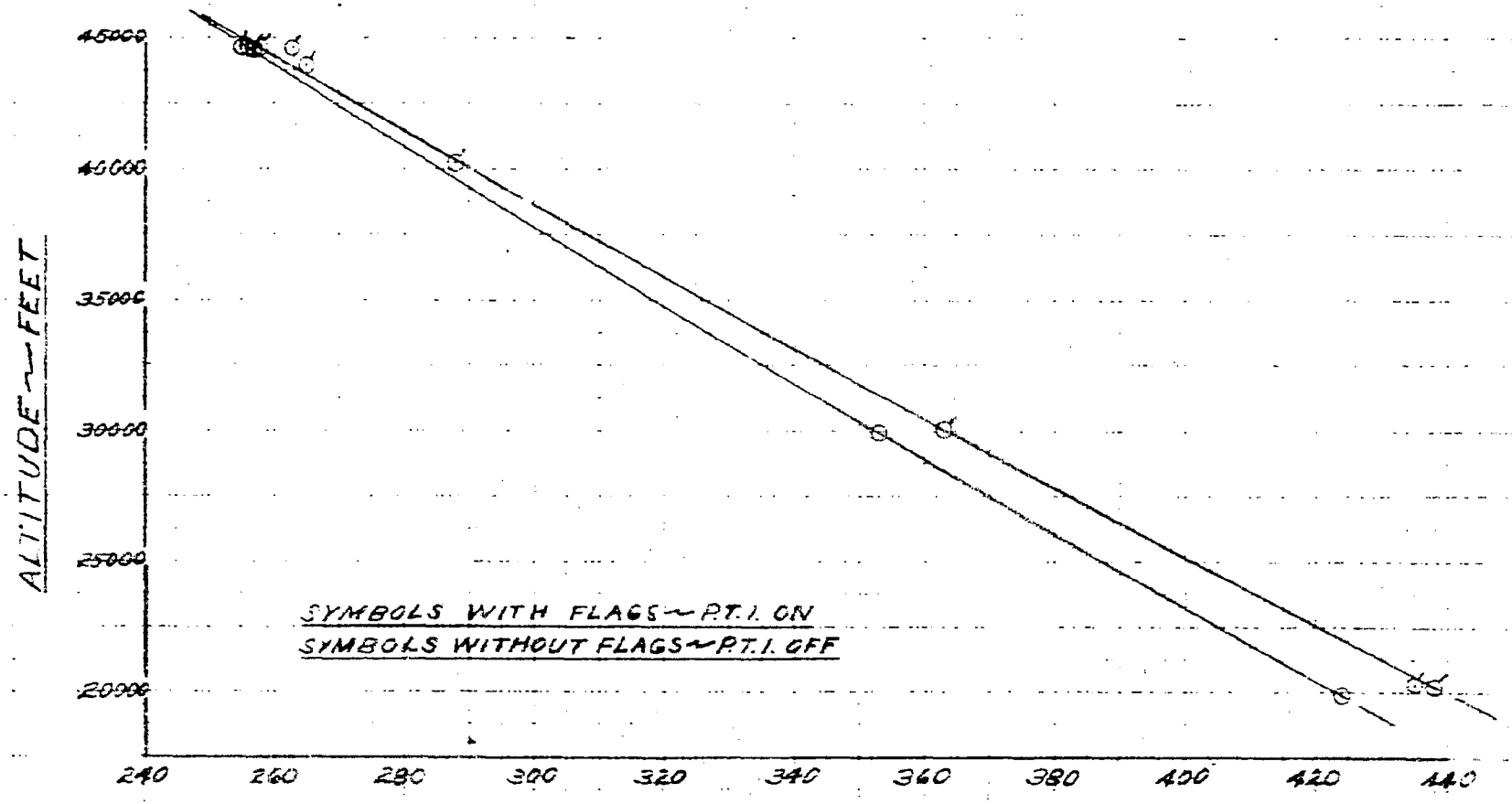


FIGURE 5
STATIC THRUST CALIBRATION
F-86F USAF No 51-13506
J47-GE-27 ENGINE WITH A.T.I.
JP-4 FUEL

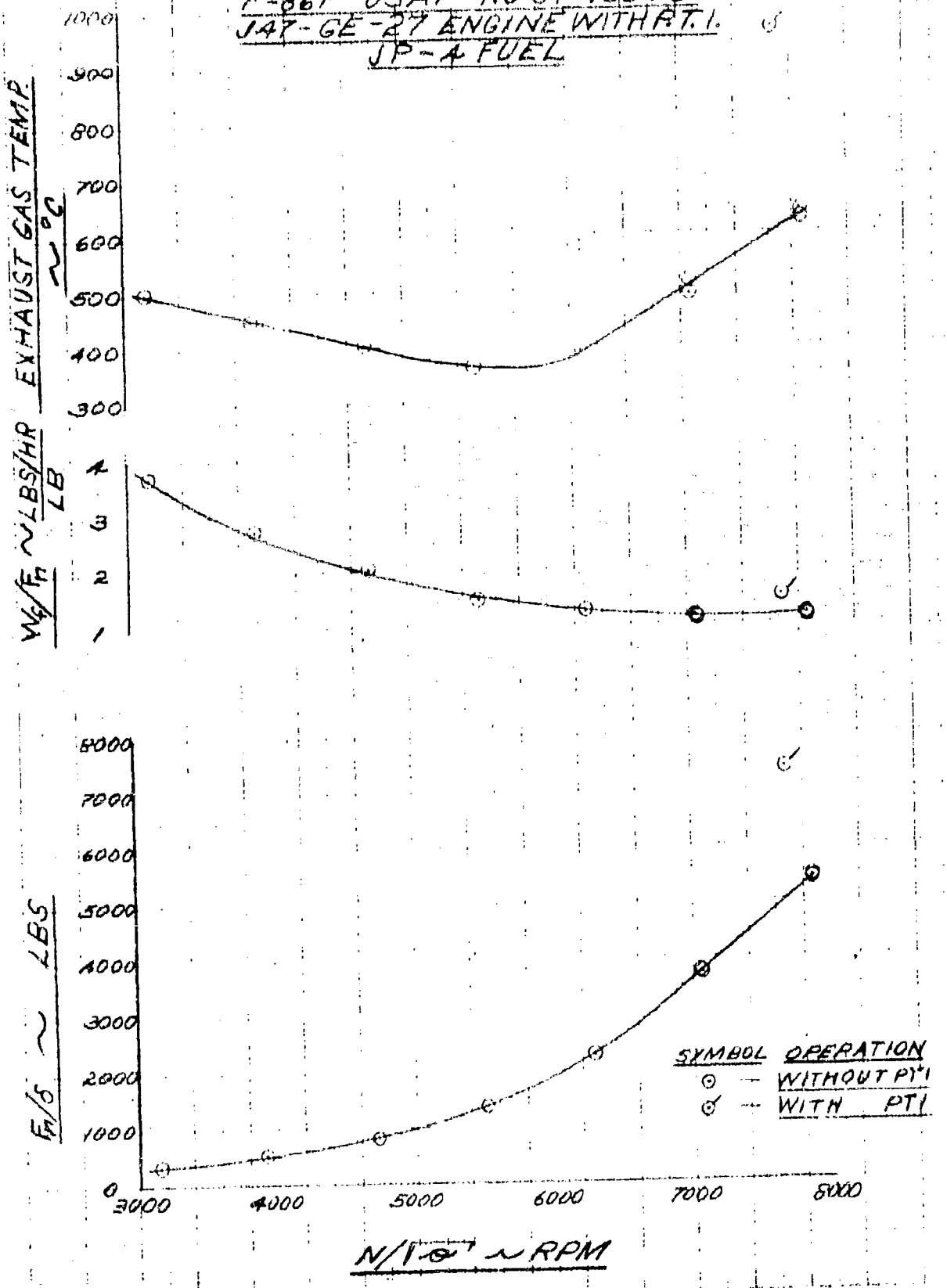
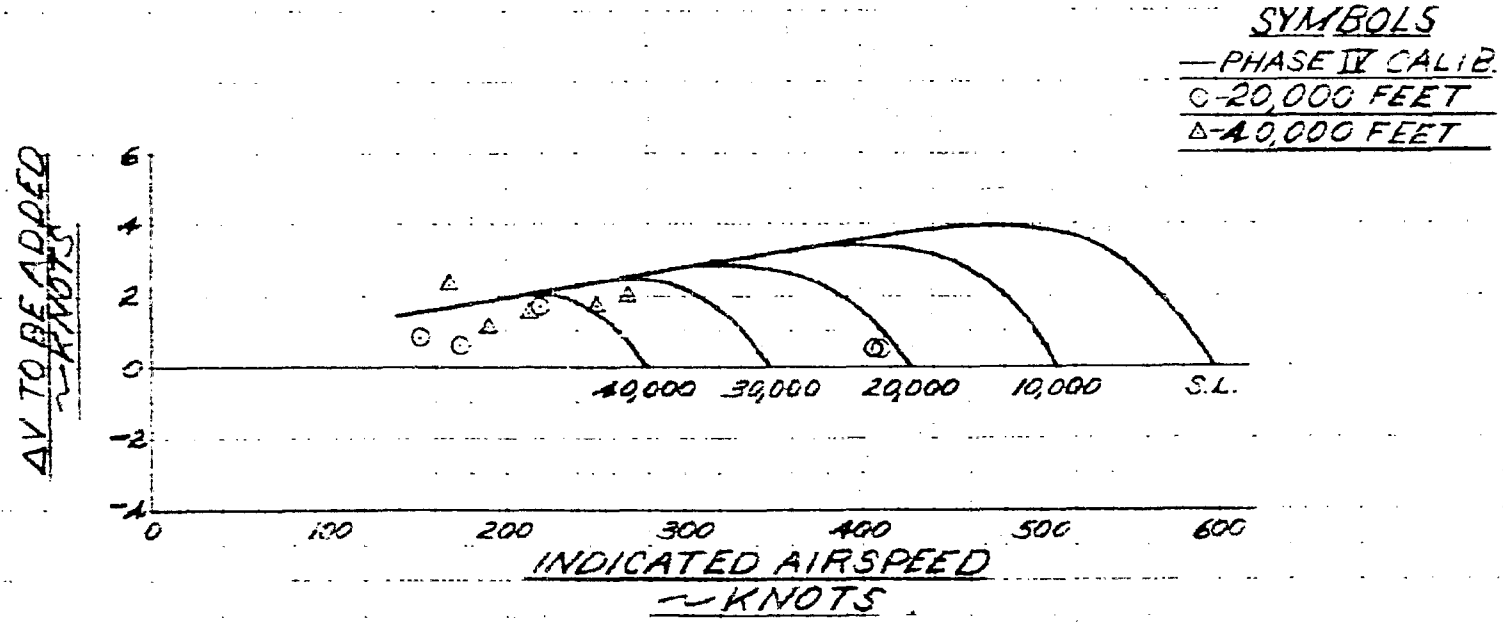


FIGURE NO 6
AIRSPEED POSITION ERROR CORRECTION
CHECK AGAINST PHASE IV CALIBRATION
WITH F-86A USAF NO 52-4349
STANDARD SYSTEM
F-86F USAF NO 51-13506



APPENDIX II

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General Information and Photographs, F-86F USAF No. 51-13506

A. DIMENSIONS

The following design data and general dimensions, except those affected by PTI modifications, were taken from the airplane model specification, North American Report No. NA-51-1091, dated 13 Feb 52:

1. General Dimensions:

Span	37.12 ft
Length (overall)	37.54 ft
Height (overall)	14.74 ft

2. Wing:

Area (including ailerons)	302.26 sq ft
Span	37.12 ft
Aspect Ratio	4.56
Taper Ratio	.510
Dihedral	3°
Sweepback (25 percent line of the basic airfoil)	35° 41"
Mean Aerodynamic Chord(length)	102.0 in
Root Chord (in the streamline)	130.16 in
Tip Chord (in the streamline)	66.34 in

Airfoil section designation root - NACA 0012-64(modified)
tip - NACA-0011-64(modified)
(Leading edge is symmetrically extended 6 inches at the root and 3 inches at the tip)

(a) Flaps

Area (total)	32.51 sq ft
Chord (mean - in the streamline)	29.62 in
Deflection	38°

(b) Ailerons

Area (each aileron)	16.36 sq ft
Deflection	up 15° dn 15°

3. Fuselage:

Width (maximum)	60.0 in
Height (to top of canopy)	78.25 in

4. Speed Brakes:

Area (total surface area)	10.98 sq ft
Deflection	50°

5. Vertical Tail:

(a) Fin:

Area (including balance area forward of the hinge line)		25.32 sq ft
Normal setting		0°
Deflection	right	0°
	left	0°

(b) Rudder:

Area (including tab and excluding rudder balance forward of the hinge line)		8.12 sq ft
Deflection	right	27.5°
	left	27.5°

(c) Tab:

Area		.87 sq ft
Deflection	right	15°
	left	15°

6. Horizontal Tail:

(a) Stabilizer:

Area (movable portion only)		19.10 sq ft
Span		12.75 ft
Root Chord		45.50 in
Deflection	up	6°
	down	10°
Dihedral		10°

(b) Elevator:

Area (aft of hinge line)		8.62 sq ft
Deflection (about the hinge line and directly related to the horizontal stabilizer angle)	up	20.9°
	dn	3.3°

B. OPERATIONAL LIMITATIONS

1. Limit Speeds

Dive (at 12,000 feet)	556 knots
Dive (at 29,000 feet)	421 knots
Flaps down	185 knots
Gear extended	185 knots

2. Limit Maneuver Load Factors

Clean configuration +5 (due to PTI ballast) to -3.

3. Power Limitations

	RPM	T. P. T. Without PTI	T. P. T. With PTI
Military (30 mins.)	7950	690°C	1100°C
Normal rated(continuous)	7630	635°C	----

4. Recommended Wing Flap Setting

Take-Off (full extension)	38°
Landing (full extension)	38°

5. Maximum in Flight CG Positions

Forward	20.4% MAC
Aft	25.3% MAC

C. POWER PLANT

1. Engine

Model	General Electric, Mfg. J-47-GE-27 with PTI modification
Engine number	085674

D. WEIGHT AND BALANCE

Configuration	Clean
Basic Weight with PTI modifications	12,288 lbs
PTI kit	197 lbs
Ballast (required with the PTI installation)	140 lbs
Pilot	200 lbs
Oil	23 lbs
Fuel (gal)	435 gals
Fuel at 6.5 lb/gal	2,828 lbs
Gross weight at engine start	15,339 lbs
C G - % MAC	25.0

E. INSTRUMENTATION

a. The instrumentation was installed and maintained by the General Electric Company at the company's facility at Edwards Air Force Base, Calif. The following instruments were installed in the airplane prior to the Air Force evaluation flights:

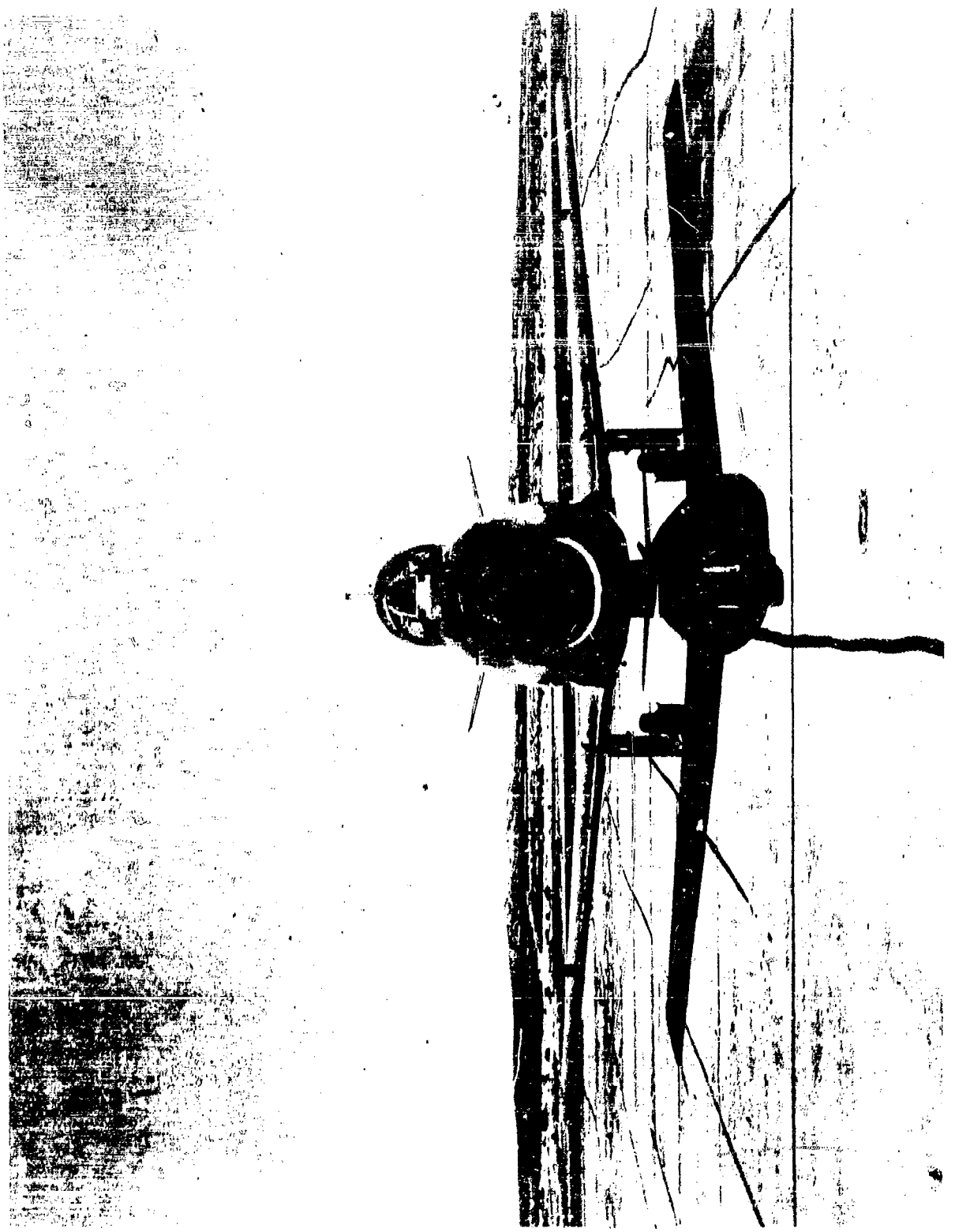
1. Coordination counter
2. Clock
3. Airspeed indicator
4. Altimeter
5. Exhaust gas temperature
6. Tachometer
7. Outside Air temperature
8. Main fuel flow
9. PTI fuel flow

All the above listed instruments which were installed in the Photo Recorder Compartment were duplicated in the cockpit with the exception of the Outside Air Temperature Indicator. For the Air Force evaluation flights the two standard altimeters were replaced by two C-19 altimeters and two Fuel Flow Totalizers were added to the instrumentation. All instruments were calibrated by General Electric except those installed for the Air Force tests which were calibrated by the Instrumentation Branch, Flight Test Engineering Laboratory, Edwards Air Force Base, California.

b. Thrust Stand fuel flows were measured by manually timing an increment on the fuel totalizer. Timing was started as the one gallon counter moved to the next number and timing was stopped approximately one minute later as the counter moved again.

c. The standard ship's airspeed system was used for all tests and was connected to indicators in the pilot's panel and photo panel. The location and dimensions of the wing boom are the same as on a standard F-86F.

d. The free air temperature was obtained from a shielded temperature bulb mounted beneath the fuselage to the right side of the centerline just aft of the nose gear. This bulb was connected to a photo-panel indicator only. The temperature recovery factor used was 1.00.



FRONT VIEW

THREE-QUARTER LEFT FRONT VIEW

LEFT SIDE VIEW

THREE-QUARTER LEFT REAR VIEW

REAR VIEW

APPENDIX III

A. FLIGHT LOG

The following listing reflects a brief history of the flight tests:

Flight No.	Date	Flight hours - min. PTI	Time Total	TESTS
1	21 Apr 54	0:06	0:31	Pilot familiarization, PTI climb 20,000 to 45,000 feet. Attempted PTI lights at 35,000 and 45,000 feet.
2	22 Apr 54	0:04	0:28	PTI climb 20,000 to 45,000 feet, attempted PTI lights at 35,000 and 45,000 feet.
3	23 Apr 54	0:45	0:48	PTI climb 20,000 to 45,000 feet, attempted PTI lights at 45,000 feet.
4	24 Apr 54	0:06.3	0:35	PTI climb 20,000 to 45,000 feet, attempted dry speed power at 35,000 feet.
5	29 Apr 54	0:03.5	0:40	Dry climb to 45,000 feet, attempted PTI lights at 20,000, 30,000, 35,000 and 45,000 feet.
6	30 Apr 54	0:05	0:50	Dry climb to 45,000 feet. Successful PTI lights at 20,000 and 35,000 feet.
7	30 Apr 54	0:07.3	0:55	Dry climb to 20,000 feet, airspeed calibration with pacer airplane at 20,000 feet.
8	30 Apr 54	0:12.1	0:55	PTI climb 20,000 to 45,000 feet, turns and dive with PTI
9	30 Apr 54	0:08	0:50	Dry climb to 45,000 feet. Successful PTI lights at 40,000 feet.
10	1 May 54	0:09	0:40	Dry climb to 45,000 ft. PTI climb 45,000 to 53,420 ft. Turbine bucket failed at 53,420 ft. Max. alt. reached was 53,760 feet.
11	4 May 54	0:06.7	1:05	PTI climb 20,000 to 45,000 feet, attempted PTI lights at 40,000 feet.
12	4 May 54	0:15.5	0:40	PTI climb 20,000 to 45,000 feet. Successful PTI lights at 40,000 and 45,000 feet.

Flight No.	Date	Flight Time - hours - min PTI	Total	TESTS
13	4 May 54	0	0:50	Dry climb to 45,000 feet. Turns at 40,000 feet.
14	4 May 54	0:12.5	0:55	PTI climb 20,000 to 45,000 feet. Turns at 45,000 feet with and without PTI. Accelerations with and without PTI at 45,000 feet.
15	5 May 54	0	0:45	Tower fly-bys. Instrumentation malfunction, no photo-recorder data.
16	5 May 54	0:01.8	0:45	Dry climb to 40,000 feet, airspeed calibration with Pacer aircraft at 20,000 and 40,000 feet.
17	5 May 54	0:05	0:50	Dry climb to 30,000 feet. Accelerations with and without PTI at 20,000 and 30,000 feet.
18	6 May 54	0:13	0:33	Familiarization and quantitative evaluation flight. Lost turbine bucket at altitude. Dead stick landings on lake bed.
19	21 May 54	0:05	1:00	Familiarization and qualitative evaluation flight.
20	25 May 54	0:17	0:40	Familiarization and qualitative evaluation flight.
21	26 May 54	0:07	0:25	Familiarization and qualitative evaluation flight. Lost turbine bucket at altitude.
	TOTALS:	3:10.2	14:40	

TEST DATA CORRECTED FOR INSTRUMENT ERROR

F-86F USAF No. 51-[illegible]

Test	CHECK CLIMB — SCHEDULE A								
Configuration	CLEAN								
Flight No.	3	3	3	3	3	3	3	3	3
Time – Min	11.38	11.69	12.09	12.41	12.82	13.63	14.28	14.73	15.14
IAS - knots	429	399.5	381.5	369.5	357	373.5	371.5	367.5	371.5
Altitude – ft	6280	8360	10260	12160	14370	16250	18220	19920	22060
Air Temp – °C	44	41	35	30	24	20	18	16	14
RPM	7810	7800	7820	7810	7820	7810	7800	7810	7720
Ex. Gas Temp – °C	660	660	660	660	660	660	650	650	630
Ex. Gas Press – "Hg									
Fuel Used – gal	115	119	124	129	135	145	152	157	165
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	CHECK CLIMB — SCHEDULE A								
Configuration	CLEAN								
Flight No.	3	3	3	3	3	3	3	3	3
Time – Min	15.38	15.58	15.78	15.99	16.26	16.63	17.08	17.39	17.68
IAS - knots	355	339	318	301.5	291.5	287.5	275.5	258	246
Altitude – ft	29150	26220	28300	30180	32120	34200	36320	38260	40300
Air Temp – °C	11	6	1	-5	-12	-20	-29	-29	-32
RPM	7710	7710	7710	7710	7710	7710	7700	7690	7690
Ex. Gas Temp – °C	950	960	970	960	950	930	925	930	970
Ex. Gas Press – "Hg									
Fuel Used – gal	169	173	176	179	183	188	192	196	200
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	CHECK CLIMB — SCHEDULE A								
Configuration	CLEAN								
Flight No.	3	3	3	3		8	8	8	8
Time – Min	17.93	18.17	18.4	18.69		2.27	2.92	3.22	3.08
IAS - knots	294	231	231	219		410	398.5	398	388
Altitude – ft	41390	42320	43260	44260		6150	7540	9700	11780
Air Temp – °C	-34	-34	-34	-32		36	32	26	23
RPM	7690	7690	7690	7700		7790	7800	7840	7840
Ex. Gas Temp – °C	970	975	1000	970		675	665	675	675
Ex. Gas Press – "Hg									
Fuel Used – gal	202	209	206	209		054	057	061	067
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	CHECK CLIMB — SCHEDULE A								
Configuration	CLEAN								
Flight No.	8	8	8	8	8	8	8	8	8
Time – Min	3.38	3.68	4.07	4.42	4.93	5.29	5.39	5.59	5.91
IAS - knots	376.5	367.5	353	339.5	358.5	355	348	329	313.5
Altitude – ft	13900	16000	18140	19880	22090	24500	25480	27860	29600
Air Temp – °C	22	22	21	17	15	14	11	7	0
RPM	7720	7810	7780	7780	7760	7760	7760	7750	7750
Ex. Gas Temp – °C	675	675	675	675	965	975	975	990	990
Ex. Gas Press – "Hg									
Fuel Used – gal	071	075	079	083	093	099	101	104	109
Fuel Flow – gal/hr									
Fuel Press – PSI									

TEST DATA CORRECTED FOR INSTRUMENT ERROR

F-86F USAF No. 51-13511

Test	CHECK CLIMB — SCHEDULE A								
Configuration	CLEAN								
Flight No.	8	8	8	8	8	8	8	8	8
Time – Min	6.37	6.75	7.09	7.35	7.65	7.81	8.02	8.32	8.62
IAS – knots	305.5	295.5	280.5	264	250	242	236	229	227
Altitude – ft	32090	34100	36140	38090	40120	41000	41900	42900	43930
Air Temp – °C	-8	-12	-17	-20	-25	-28	-31	-35	-38
RPM	7750	7750	7750	7740	7740	7720	7730	7720	7720
Ex. Gas Temp – °C	965	955	945	945	975	990	990	1010	1010
Ex. Gas Press – "Hg									
Fuel Used – gal	115	120	124	127	130	132	134	137	139
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	CHECK CLIMB — SCHEDULE A								
Configuration	CLEAN								
Flight No.	8		12	12	12	12	12	12	12
Time – Min	8.93		2.86	3.27	3.67	4.12	4.74	5.36	6.06
IAS – knots	229.5		403.5	397.5	376.5	370.5	362.5	352	345
Altitude – ft	44910		6220	8100	10180	12240	14360	16400	18400
Air Temp – °C	-37		9	3	3	2	2	2	2
RPM	7720		7660	7730	7750	7740	7740	7740	7700
Ex. Gas Temp – °C	1010		650	665	665	665	665	665	665
Ex. Gas Press – "Hg									
Fuel Used – gal	142		68	74	80	86	94	101	108
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	CHECK CLIMB — SCHEDULE A								
Configuration	CLEAN								
Flight No.	12	12	12	12	12	12	12	12	12
Time – Min	6.57	7.09	7.29	7.59	7.90	8.05	8.36	8.67	9.07
IAS – knots	346	358.5	334.5	341.5	321	316	296	285.5	272
Altitude – ft	19960	22290	23520	24900	28380	29540	31760	33890	36160
Air Temp – °C	21	18	16	11	5	2	-5	-11	-17
RPM	7710	7730	7730	7730	7720	7710	7710	7700	7700
Ex. Gas Temp – °C	665	965	965	990	990	990	990	975	965
Ex. Gas Press – "Hg									
Fuel Used – gal	119	123	127	132	137	139	144	147	152
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	CHECK CLIMB — SCHEDULE A								
Configuration	CLEAN								
Flight No.	12	12	12	12	12	12	12		
Time – Min	9.43	9.78	9.99	10.29	10.70	10.95	11.21		
IAS – knots	266	248	235	230	236	228	213.5		
Altitude – ft	38160	40240	41360	42200	43140	44100	45220		
Air Temp – °C	-23	-26	-30	-32	-39	-34	-36		
RPM	7700	7710	7710	7700	7700	7700	7710		
Ex. Gas Temp – °C	945	945	945	955	955	965	965		
Ex. Gas Press – "Hg									
Fuel Used – gal	156	160	162	166	168	171	173		
Fuel Flow – gal/hr									
Fuel Press – PSI									

TEST DATA CORRECTED FOR INSTRUMENT ERROR

F 86F, USAF No. [illegible]

Test	CHECK CLIMB ~ SCHEDULE B								
Configuration	CLEAN								
Flight No.	9	[illegible]	9	9	9	9	9	9	9
Time – Min	1.39	1.65	1.92	2.17	2.42	2.83	3.14	3.65	4.19
IAS – knots	[illegible]	[illegible]	411.4	389	[illegible]	[illegible]	351	341.5	335
Altitude – ft	6260	7920	10780	12190	14020	16220	17980	20000	22000
Air Temp – °C	35	30	26	28	[illegible]	25	23	17	12
RPM	7800	7820	7820	7820	[illegible]	7800	7800	7780	7760
Ex. Gas Temp – °C	665	665	665	665	625	675	675	675	675
Ex. Gas Press – "Hg									
Fuel Used – gal	57	[illegible]	66	70	71	75	79	84	89
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	CHECK CLIMB ~ SCHEDULE B								
Configuration	CLEAN								
Flight No.	9	9	9	9	9	9	9	9	9
Time – Min	4.67	5.14	5.70	6.21	6.67	7.63	8.92	9.73	10.54
IAS – knots	321	309.5	304.5	296.5	276	271	267	256	247
Altitude – ft	24180	26080	28000	29980	31980	34040	36020	38040	40000
Air Temp – °C	7	1	-4	-7	-13	-21	-23	-26	-33
RPM	7760	7760	7760	7750	7730	7740	7750	7760	7760
Ex. Gas Temp – °C	675	665	675	675	665	675	675	665	675
Ex. Gas Press – "Hg									
Fuel Used – gal	94	99	103	107	110	117	125	130	135
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	CHECK CLIMB ~ SCHEDULE B								
Configuration	CLEAN								
Flight No.	9	9	9	9	9		14	14	14
Time – Min	11.22	11.98	12.91	15.05	16.98		3.03	3.34	3.80
IAS – knots	244	240	229	226	217.5		414	402.5	396.5
Altitude – ft	40980	42000	43000	44000	45100		6200	7980	10160
Air Temp – °C	-35	-38	-39	-37	-31		44	41	36
RPM	7760	7770	7770	7750	7780		7730	7720	7780
Ex. Gas Temp – °C	675	675	675	665	665		650	650	665
Ex. Gas Press – "Hg									
Fuel Used – gal	139	143	147	158	166		66	71	78
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	CHECK CLIMB ~ SCHEDULE B								
Configuration	CLEAN								
Flight No.	14	14	14	14	14	14	14	14	14
Time – Min	4.20	4.87	5.44	5.90	6.51	6.86	7.12	7.38	7.58
IAS – knots	381.5	384	377.5	354	350	341	331	314	301
Altitude – ft	12160	14040	15980	17960	19900	22000	24020	26260	28060
Air Temp – °C	32	31	30	26	22	18	13	7	2
RPM	7770	7800	7800	7780	7770	7750	7740	7740	7730
Ex. Gas Temp – °C	665	675	675	675	675	1010	1010	1025	1035
Ex. Gas Press – "Hg									
Fuel Used – gal	83	92	99	104	111	118	122	127	130
Fuel Flow – gal/hr									
Fuel Press – PSI									

APPENDIX III

TEST DATA CORRECTED FOR INSTRUMENT ERROR

F-86F, USAF No. 51-13509

Test	CHECK CLIMB – SCHEDULE B								
Configuration	CLEAN								
Flight No.	14	14	14	14	14	14	14	14	14
Time – Min	1.88	8.18	8.60	8.95	9.27	9.62	9.82	10.13	10.59
IAS – knots	291	280.5	271	269	257.5	242	231	227	231
Altitude – ft	30180	32010	33960	36080	37820	34900	40960	42020	43020
Air Temp – °C	-9	-11	-16	-21	-29	-29	-31	-34	-35
RPM	7730	7720	7720	7700	7690	7680	7690	7690	7690
Ex. Gas Temp – °C	1030	1010	975	975	975	975	990	990	990
Ex. Gas Press – "Hg									
Fuel Used – gal	139	138	144	148	151	155	157	160	169
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	CHECK CLIMB – SCHEDULE B								
Configuration	CLEAN								
Flight No.	14		16	16	16	16	16	16	16
Time – Min	10.90		2.28	2.63	3.09	3.50	4.02	4.53	4.95
IAS – knots	226		425	408	404	379	378.5	371.5	359.5
Altitude – ft	43980		9000	5980	7960	9900	12020	14060	15980
Air Temp – °C	-36		46	96	42	38	33	32	27
RPM	7680		7740	7750	7750	7740	7730	7720	7720
Ex. Gas Temp – °C	990		665	665	665	665	665	675	675
Ex. Gas Press – "Hg									
Fuel Used – gal	167		57	62	69	75	82	89	94
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	CHECK CLIMB – SCHEDULE B								
Configuration	CLEAN								
Flight No.	16	16	16	16	16	16	16	16	16
Time – Min	5.45	6.03	6.53	7.21	7.88	8.55	9.27	10.29	11.11
IAS – kp ts	349.5	341.5	328	321	311.5	303.5	293.5	281.5	225
Altitude – t.	18120	20080	22060	24060	25960	28000	29940	32020	34060
Air Temp – °C	22	17	11	6	3	-3	-8	-15	-20
RPM	7710	7710	7710	7680	7670	7670	7660	7690	7700
Ex. Gas Temp – °C	665	665	675	675	675	675	665	665	665
Ex. Gas Press – "Hg									
Fuel Used – gal	100	106	111	117	123	129	139	142	148
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	CHECK CLIMB – SCHEDULE B								
Configuration	CLEAN								
Flight No.	16	16	16	16	16	16	16	16	
Time – Min	11.93	12.63	13.88	14.43	15.00	15.82	16.53	17.19	
IAS – knots	266	254	247	243	236	239	236	222.5	
Altitude – ft	36000	38040	40000	41020	42060	43040	44020	44680	
Air Temp – °C	-29	-39	-35	-36	-36	-37	-38	-39	
RPM	7720	7740	7720	7730	7730	7720	7730	7660	
Ex. Gas Temp – °C	665	665	665	665	665	665	675	670	
Ex. Gas Press – "Hg									
Fuel Used – gal	153	157	164	167	170	174	178	181	
Fuel Flow – gal/hr									
Fuel Press – PSI									

TEST DATA CORRECTED FOR INSTRUMENT ERROR

F-86F, USAF No. 51-[illegible]

Test Configuration	ACCELERATION CLEAN								
Flight No. – RUN NO.	14-1	14-1	14-1	14-1	14-1	14-1	14-1	14-1	14-1
Time – Min	.07	.10	.20	.31	.42	.50	.62	.72	.82
IAS – knots	207	212	215	218.5	223.5	228	232	238	244
Altitude – ft	44420	44380	44400	44480	44520	44500	44500	44540	44540
Air Temp – °C	-44	-44	-43	-42	-42	-41	-41	-40	-39
RPM	7580	7550	7530	7530	7540	7550	7550	7560	7560
Ex. Gas Temp – °C	915	925	925	935	935	945	945	955	955
Ex. Gas Press – "Hg									
Fuel Used – gal	307	307	308	309	310	311	312	312	313
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test Configuration	ACCELERATION CLEAN								
Flight No. – RUN NO.	14-1	14-1	14-1	14-1	14-1		14-2	14-2	14-2
Time – Min	.92	1.02	1.12	1.22	1.28		.02	.12	.22
IAS – knots	250	255	257	258	258		206	207	206
Altitude – ft	44460	44400	44440	44580	44620		44400	44400	44460
Air Temp – °C	-38	-37	-36	-36	-36		-44	-47	-46
RPM	7560	7570	7580	7610	7740		7750	7680	7630
Ex. Gas Temp – °C	955	965	965	965	825		675	650	650
Ex. Gas Press – "Hg									
Fuel Used – gal	314	315	316	317	317		331	331	331
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test Configuration	ACCELERATION CLEAN								
Flight No. – RUN NO.	14-2	14-2	14-2	14-2	14-2	14-2	14-2	14-2	14-2
Time – Min	.32	.42	.52	.63	.73	.83	.93	1.03	1.14
IAS – knots	207	209	211	212.5	214.5	218.5	220.5	221.5	222.5
Altitude – ft	44520	44540	44520	44500	44480	44440	44420	44420	44440
Air Temp – °C	-46	-46	-44	-46	-45	-44	-44	-44	-44
RPM	7620	7620	7620	7610	7610	7620	7620	7630	7630
Ex. Gas Temp – °C	650	650	650	650	650	650	650	650	650
Ex. Gas Press – "Hg									
Fuel Used – gal	332	332	333	333	334	334	335	335	335
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test Configuration	ACCELERATION CLEAN								
Flight No. – RUN NO.	14-2	14-2	14-2	14-2	14-2	14-2	14-2	14-2	14-2
Time – Min	1.23	1.34	1.46	1.55	1.65	1.74	1.84	1.94	2.06
IAS – knots	223.5	224.5	227.5	230	232	234	236	237	240
Altitude – ft	44460	44500	44520	44500	44480	44460	44460	44480	44480
Air Temp – °C	-42	-42	-42	-41	-41	-45	-45	-43	-45
RPM	7640	7640	7640	7650	7650	7640	7650	7650	7660
Ex. Gas Temp – °C	650	650	650	650	650	650	650	650	650
Ex. Gas Press – "Hg									
Fuel Used – gal	336	336	337	337	338	338	339	339	340
Fuel Flow – gal/hr									
Fuel Press – PSI									

TEST DATA CORRECTED FOR INSTRUMENT ERROR

F-86F, USAF No. [illegible]

Test Configuration	ACCELERATION CLEAN								
Flight No. — RUN No.	14-2	14-2	14-2	14-2	14-2	14-2	14-2	14-2	14-2
Time – Min	2.16	2.26	2.36	2.46	2.56	2.66	2.76	2.86	2.96
IAS – knots	243	242	246	246	246	247	249	250	250
Altitude – ft	44440	44420	44400	44450	44500	14500	44480	44440	44440
Air Temp – °C	-42	-40	-38	-36	-35	-35	-35	-35	-35
RPM	7660	7660	7660	7660	7660	7660	7660	7650	7650
Ex. Gas Temp – °C	650	650	650	650	650	650	650	650	650
Ex. Gas Press – "Hg									
Fuel Used – gal	340	341	341	342	342	343	343	344	344
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test Configuration	ACCELERATION CLEAN								
Flight No. — RUN No.	14-2	14-2	14-2	14-2					
Time – Min	3.06	3.17	3.22	3.27					
IAS – knots	250	254	256	255					
Altitude – ft	44500	44480	44380	44240					
Air Temp – °C	-35	-35	-35	-34					
RPM	7650	7650	7650	7650					
Ex. Gas Temp – °C	650	650	650	650					
Ex. Gas Press – "Hg									
Fuel Used – gal	345	345	345	346					
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test Configuration	ACCELERATION CLEAN								
Flight No. — RUN No.				17-1	17-1	17-1	17-1	17-1	17-1
Time – Min				0	.10	.20	.31	.42	.52
IAS – knots				164	172	180	188	198	207
Altitude – ft				19780	19780	19800	19840	19860	19880
Air Temp – °C				-5	-5	-5	-5	-5	-5
RPM				7820	7830	7810	7760	7770	7640
Ex. Gas Temp – °C				640	665	685	675	665	665
Ex. Gas Press – "Hg									
Fuel Used – gal				89	90	91	92	93	94
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test Configuration	ACCELERATION CLEAN								
Flight No. — RUN No.	17-1	17-1	17-1	17-1	17-1	17-1	17-1	17-1	17-1
Time – Min	.62	.72	.82	.93	1.03	1.13	1.23	1.33	1.43
IAS – knots	217	226	235	243	252	262	273	282	288
Altitude – ft	19880	19860	19860	19820	19820	19900	19880	19880	19880
Air Temp – °C	-3	-3	-2	-1	0	2	3	4	
RPM	7630	7630	7620	7620	7620	7620	7620	7620	7620
Ex. Gas Temp – °C	665	665	665	675	675	665	665	665	665
Ex. Gas Press – "Hg									
Fuel Used – gal	95	96	97	98	99	100	101	102	103
Fuel Flow – gal/hr									
Fuel Press – PSI									

TEST DATA CORRECTED FOR INSTRUMENT ERROR

F-86F, USAF No. 51-13506

Test	ACCELERATION								
Configuration	CLEAN								
Flight No. — RUN No.	17-1	17-1	17-1	17-1	17-1	17-1	17-1	17-1	17-1
Time — Min	1.54	1.64	1.74	1.84	1.94	2.04	2.15	2.25	2.35
IAS — knots	298	306	314	322	331	340	347	354	362
Altitude — ft	19900	19940	19940	19940	19960	19900	19880	19900	19920
Air Temp — °C	5	6	7	8	9	10	12	13	14
RPM	7610	7600	7600	7600	7600	7600	7600	7600	7600
Ex. Gas Temp — °C	665	665	665	665	665	665	665	665	665
Ex. Gas Press — "Hg									
Fuel Used — gal	104	105	106	107	108	109	110	111	112
Fuel Flow — gal/hr									
Fuel Press — PSI									

Test	ACCELERATION								
Configuration	CLEAN								
Flight No. — RUN No.	17-1	17-1	17-1	17-1	17-1	17-1	17-1	17-1	17-1
Time — Min	2.96	2.57	2.67	2.77	2.87	2.97	3.07	3.17	3.27
IAS — knots	370	378	384	389	394	400	406	410	413
Altitude — ft	19920	19880	19880	19900	19920	19920	19900	19900	19920
Air Temp — °C	15	16	17	19	20	21	22	22	24
RPM	7600	7600	7610	7620	7620	7620	7620	7620	7620
Ex. Gas Temp — °C	665	650	665	665	650	665	665	650	665
Ex. Gas Press — "Hg									
Fuel Used — gal	113	114	115	116	118	119	120	121	122
Fuel Flow — gal/hr									
Fuel Press — PSI									

Test	ACCELERATION								
Configuration	CLEAN								
Flight No. — RUN No.	17-1	17-1	17-1	17-1	17-1	17-1	17-1	17-1	
Time — Min	3.38	3.48	3.58	3.68	3.78	3.88	3.98	4.03	
IAS — knots	418	421	422	423	423	423	423	424	
Altitude — ft	19920	19900	19920	19900	19860	19880	19880	19880	
Air Temp — °C	24	25	26	26	26	26	26	26	
RPM	7620	7620	7620	7630	7630	7630	7630	7630	
Ex. Gas Temp — °C	650	650	650	650	650	650	650	650	
Ex. Gas Press — "Hg									
Fuel Used — gal	123	125	126	127	128	129	130	131	
Fuel Flow — gal/hr									
Fuel Press — PSI									

Test	ACCELERATION								
Configuration	CLEAN								
Flight No. — RUN No.	17-2	17-2	17-2	17-2	17-2	17-2	17-2	17-2	17-2
Time — Min	0	.03	.11	.21	.32	.42	.52	.62	.72
IAS — knots	165	168	178.5	191	213	226	243	264	284.5
Altitude — ft	19880	19880	19880	19860	19840	19920	20000	19960	19880
Air Temp — °C	−6	−6	−6	−5	−4	−4	−2	−1	1
RPM	7820	7840	7720	7710	7730	7740	7790	7740	7750
Ex. Gas Temp — °C	665	675	900	945	965	975	990	1000	1000
Ex. Gas Press — "Hg									
Fuel Used — gal	150	150	152	154	155	157	159	161	163
Fuel Flow — gal/hr									
Fuel Press — PSI									

TEST DATA CORRECTED FOR INSTRUMENT ERROR

F-86F, USAF No. 51-13506

Test	ACCELERATION								
Configuration	CLEAN								
Flight No. – RUN NO.	17-2	17-2	17-2	17-2	17-2	17-2	17-2	17-2	17-2
Time – Min	.82	.92	1.03	1.13	1.23	1.34	1.44	1.54	1.64
IAS – knots	301.5	319	337.5	356.5	376.5	392	410	428	434
Altitude – ft	19880	19940	19960	19980	19920	19980	20060	20020	19940
Air Temp – °C	3	5	6	9	12	16	19	21	24
RPM	7760	7760	7760	7780	7780	7790	7790	7800	7800
Ex. Gas Temp – °C	1000	1000	1000	990	990	990	990	975	965
Ex. Gas Press – "Hg									
Fuel Used – gal	165	167	169	171	173	175	177	179	181
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	ACCELERATION								
Configuration	CLEAN								
Flight No. – RUN NO.	17-2	17-2	17-2	17-2		17-3	17-3	17-3	17-3
Time – Min	1.73	1.85	1.95	2.05		0	.09	.19	.29
IAS – knots	436	438	439	438		156	158	162	167
Altitude – ft	19980	19980	19960	19980		29760	29760	29780	29800
Air Temp – °C	26	27	27	28		-28	-28	-28	-28
RPM	7800	7800	7800	7800		7730	7800	7810	7820
Ex. Gas Temp – °C	965	965	955	955		615	600	625	640
Ex. Gas Press – "Hg									
Fuel Used – gal	184	186	188	190		226	226	227	228
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	ACCELERATION								
Configuration	CLEAN								
Flight No. – RUN NO.	17-3	17-3	17-3	17-3	17-3	17-3	17-3	17-3	17-3
Time – Min	.39	.49	.59	.70	.80	.91	1.01	1.11	1.16
IAS – knots	174.0	181.5	196.5	189	197	202	209	216	216.5
Altitude – ft	29800	29760	29740	29740	29760	29760	29750	29740	29740
Air Temp – °C	-27	-27	-27	-27	-26	-26	-26	-25	-24
RPM	7810	7810	7810	7780	7770	7740	7730	7730	7730
Ex. Gas Temp – °C	650	←						→	650
Ex. Gas Press – "Hg									
Fuel Used – gal	229	229	230	231	231	232	233	233	234
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	ACCELERATION								
Configuration	CLEAN								
Flight No. – RUN NO.	17-3	17-3	17-3	17-3	17-3	17-3	17-3	17-3	17-3
Time – Min	1.21	1.31	1.41	1.51	1.61	1.72	1.82	1.92	2.03
IAS – knots	219.5	223.5	229.0	236	243	249	255	261	266
Altitude – ft	29740	29800	29800	29800	29760	29740	29720	29740	29760
Air Temp – °C	-24	-24	-23	-22	-22	-21	-20	-20	-19
RPM	7730	7720	7720	7720	7720	7720	7720	7720	7720
Ex. Gas Temp – °C	650	←						→	650
Ex. Gas Press – "Hg									
Fuel Used – gal	234	235	236	236	237	238	238	239	240
Fuel Flow – gal/hr									
Fuel Press – PSI									

TEST DATA CORRECTED FOR INSTRUMENT ERROR

F-86F, USAF No. 51-13506

Test	ACCELERATION								
Configuration	CLEAN								
Flight No. – RUN NO.	17-3	←							17-3
Time – Min	2.12	2.23	2.32	2.42	2.52	2.62	2.72	2.79	2.84
IAS – knots	272	278	284.5	288.5	296.5	301.5	308.5	311.5	315
Altitude – ft	29780	29760	29760	29760	29760	29760	29760	29740	29720
Air Temp – °C	-18	-17	-16	-15	-14	-13	-12	-11	-10
RPM	7720	←							7720
Ex. Gas Temp – °C	650	←							650
Ex. Gas Press – "Hg									
Fuel Used – gal	291	292	292	293	294	295	296	296	296
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	ACCELERATION								
Configuration	CLEAN								
Flight No. – RUN NO.	17-3	←							17-3
Time – Min	3.20	3.27	3.20	3.30	3.35	3.45	3.55	3.66	3.71
IAS – knots	322	326	332	337.5	340.5	344	348	350	347
Altitude – ft	29720	29760	29760	29740	29720	29680	29700	29700	29700
Air Temp – °C	-9	-8	-7	-6	-6	-5	-4	-4	-4
RPM	7720	7720	7710	7710	7710	7710	7710	7590	6670
Ex. Gas Temp – °C	650	←					→	590	365
Ex. Gas Press – "Hg									
Fuel Used – gal	298	298	299	250	251	251	252	253	253
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	ACCELERATION								
Configuration	CLEAN								
Flight No. – RUN No.	17-4	←							17-4
Time – Min	0	.05	.15	.26	.36	.46	.56	.66	.71
IAS – knots	159	155	163	173	185.5	196	206	216.5	226
Altitude – ft	29800	29800	29800	29800	29800	29780	29760	29780	29800
Air Temp – °C	-29	-29	-28	-28	-28	-28	-27	-26	-29
RPM	7680	7800	7690	7600	7550	7550	7550	7550	7560
Ex. Gas Temp – °C	590	650	860	890	925	935	945	995	965
Ex. Gas Press – "Hg									
Fuel Used – gal	279	280	281	282	284	285	286	287	289
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	ACCELERATION								
Configuration	CLEAN								
Flight No. – RUN No.	17-4	←							17-4
Time – Min	.87	.91	1.02	1.12	1.27	1.32	1.47	1.57	1.67
IAS – knots	239	252	264	275	288.5	301.5	316.5	330	343
Altitude – ft	29820	29800	29780	29820	29840	29860	29820	29820	29860
Air Temp – °C	-24	-22	-20	-19	-18	-16	-14	-11	-9
RPM	7580	7600	7630	7660	7690	7720	7720	7730	7730
Ex. Gas Temp – °C	965	965	965	990	990	990	990	990	1010
Ex. Gas Press – "Hg									
Fuel Used – gal	290	291	293	294	295	296	298	299	301
Fuel Flow – gal/hr									
Fuel Press – PSI									

TEST DATA CORRECTED FOR INSTRUMENT ERROR

F-86F, USAF No. 51-13506

Test	ACCELERATION								
Configuration	CLEAN								
Flight No. – RUN NO.	17-1	17-1	17-1	17-1					
Time – Min	1.78	1.88	1.99	2.09					
IAS – knots	356	361.5	363.5	364.5					
Altitude – ft	29840	29780	29780	29280					
Air Temp – °C	-7	-4	-3	-1					
RPM	7240	7240	7240	7240					
Ex. Gas Temp – °C	1000	1000	1000	990					
Ex. Gas Press – "Hg									
Fuel Used – gal	302	309	306	308					
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	MAXIMUM LEVEL FLIGHT AIRSPEED								
Configuration	CLEAN – WITH PTF								
Flight No.	1	3	3	3	8	9	14	17	17
Time – Min									
IAS – knots	257	435	291	253	265	266	258	439	364
Altitude – ft	44540	20900	40180	44530	44810	43900	44580	19960	29780
Air Temp – °C	-28	+18	-32	-27	-26	-36	-36	+27	-1
RPM	7120	7290	7700	7800	7760	7750	7610	7800	7740
Ex. Gas Temp – °C	1010	945	900	760	945	945	965	955	990
Ex. Gas Press – "Hg									
Fuel Used – gal									
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test	MAXIMUM LEVEL FLIGHT AIRSPEED								
Configuration	CLEAN – WITHOUT PTF								
Flight No.	14	17	17						
Time – Min									
IAS – knots	256	424	350						
Altitude – ft	44380	19880	29760						
Air Temp – °C	-35	+26	-4						
RPM	7250	7650	7850						
Ex. Gas Temp – °C	650	650	590						
Ex. Gas Press – "Hg									
Fuel Used – gal									
Fuel Flow – gal/hr									
Fuel Press – PSI									

Test									
Configuration									
Flight No.									
Time – Min									
IAS – knots									
Altitude – ft									
Air Temp – °C									
RPM									
Ex. Gas Temp – °C									
Ex. Gas Press – "Hg									
Fuel Used – gal									
Fuel Flow – gal/hr									
Fuel Press – PSI									

TEST DATA CORRECTED FOR INSTRUMENT ERROR

F-86F, USAF No. 13506

Test	AIRSPEED CALIBRATION									
Configuration	LANDING GEAR + FLAPS RETRACTED									
Flight No.	7	16	16	16	16	16	16	16	16	16
IAS – knots	406	269	251	213	190	168	411	219.5	176	151.5
CAS Pacer – mph	468.5	307.5	287.5	243.5	216.5	191	473	251	202	173.5
Altitude – ft	19930	39700	37800	39800	39500	39250	19900	19700	19700	19740
Air Temp – °C	+20	-30	-35	-40	-45	-48	+27	0	-3	-6
Fuel Used – gal										
Gear/Flaps										
Time – min										

Test										
Configuration										
Flight No.										
IAS knots										
CAS Pacer – mph										
Altitude – ft										
Air Temp – °C										
Fuel Used – gal										
Gear/Flaps										
Time – min										

Test										
Configuration										
Flight No.										
IAS – knots										
CAS Pacer – mph										
Altitude – ft										
Air Temp – °C										
Fuel Used – gal										
Gear/Flaps										
Time – min										

Test										
Configuration										
Flight No.										
IAS – knots										
CAS Pacer – mph										
Altitude – ft										
Air Temp – °C										
Fuel Used – gal										
Gear/Flaps										
Time – min										

APPENDIX III

TEST DATA CORRECTED FOR INSTRUMENT ERROR
F-86F USAF No. 51-13506

Test	STATIC THRUST CALIBRATION — 20MAY54 - EDWARDS AFB								
Configuration	INLET SCREENS RETRACTED								
Thrust Run No.	1	1	1	1	1	1	1	1	1
RPM	3185	3960	4775	5565	6360	7145	7950	7225	7950
Air Temp °C	20.4	20.6	20.9	21.2	21.4	21.6	21.8	22.1	22.2
EGT °C	500	450	410	360	390	510	640	965	625
Atmospheric Pressure "Hg	27.515	27.515	27.515	27.515	27.515	27.515	27.515	27.515	27.515
Gross Thrust - lbs	290	475	760	1270	2090	3450	4995	6805	4950
Fuel Used - gal	4	5	5	6	8	12	18	27	17
Wind Direction	SOUTH ←								→ SOUTH
Wind Velocity - knots	7	7	8	8	8	9	8	9	11
Δ Time - Sec	87.3	90.4	76.0	75.3	73.6	72.0	73.3	62.3	70.3

Test	STATIC THRUST CALIBRATION — 20MAY54 - EDWARDS AFB								
Configuration	INLET SCREENS RETRACTED								
Thrust Run No.	1								
RPM	7155								
Air Temp °C	22.4								
EGT °C	490								
Atmospheric Pressure "Hg	27.56								
Gross Thrust - lbs	3430								
Fuel Used - gal	12								
Wind Direction	SOUTH								
Wind Velocity - knots	10								
Δ Time - Sec	73.4								

APPENDIX IV
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AF Technical Report No. AFFTC 54-16

COMDR AFFTC, EDWARDS AFB, CALIFORNIA

COMDR WADC, WRIGHT-PATTERSON AFB, OHIO 3 MAY 54

SUBJECT FLIGHT TEST OF PTI INSTALLATION IN F-86F....

THE AIR FORCE PHASE FOUR AND OPERATIONAL SUITABILITY TEST OF THE GENERAL ELECTRIC BAILMENT AIRCRAFT F-86F S/N 506 EQUIPPED WITH PRE-TURBINE INJECTION BEGAN 21 APRIL 54. TO DATE FOUR FLIGHTS UTILIZING NINETEEN MINUTES PTI TIME HAVE BEEN CONDUCTED. PTI WAS STARTED ON ALL FOUR FLIGHTS AT 20,000 FEET ALTITUDE DURING THE CLIMB AND SHUT OFF AT 45,000 FEET ALTITUDE EXCEPT ON THE LAST FLIGHT WHEN THE PILOT LEFT PTI ON AND LEVELED OFF AT 45,000 FEET ALTITUDE WHERE THE PTI BLEW OUT. OPERATION HAS BEEN SATISFACTORY DURING THE CLIMBS FROM 20,000 to 45,000 FEET ALTITUDE ON THESE FOUR FLIGHTS. HOWEVER DUE TO BINDING OF THE NOZZLE ACTUATOR ASSEMBLY IT HAS NOT BEEN POSSIBLE TO MAINTAIN SATISFACTORY PTI OPERATION IN LEVEL FLIGHT. IN THOSE CASES WHERE A PTI LIGHT WAS ACCOMPLISHED IN LEVEL FLIGHT THE NOZZLE STUCK IN THE CLOSED POSITION RESULTING IN A CRITICAL DROP OFF IN MAIN ENGINE SPEED DUE TO THE INCREASED PTI PRESSURES. REPLACEMENT OF THE NOZZLE AND ACTUATOR ASSEMBLY DID NOT ELIMINATE THE BINDING. INVESTIGATION REVEALED THAT OIL LEAKAGE FROM A BEARING IN THE ACTUATOR MOTOR COULD BE CAUSING THE JACK-SHAFT TO GUM UP AND BIND, AND ALSO COULD BE CAUSING THE ACTUATOR MOTOR BRAKE TO EXPAND AND BIND DURING MOTOR OPERATION. AT THIS TIME THE ACTUATOR MOTOR IS BEING MODIFIED IN AN ATTEMPT TO ELIMINATE THIS PROBLEM. ANOTHER FACTOR THAT MAY HAVE CONTRIBUTED TO THE BINDING IS THE EXCESSIVE FRICTION AT THE ACTUATING ARM SLOTS IN THE NOZZLE. AT PRESENT A NOZZLE WITH SURFACE HARDENED ACTUATING ARM SLOTS AND SURFACE HARDENED SEGMENTS HAS BEEN INSTALLED. IT IS EXPECTED THAT THE PROBLEM OF THE BINDING NOZZLE WILL BE ELIMINATED WITHIN THE NEXT WEEK. HOWEVER, CONSIDERABLE DELAY HAS ALREADY RESULTED FROM THIS MALFUNCTION. IN ORDER TO SATISFACTORILY ACCOMPLISH THE PHASE FOUR FLIGHT TEST AND OPERATIONAL SUITABILITY TEST IT WILL BE NECESSARY TO EXTEND THE PROGRAM DURATION FROM TWO WEEKS TO SIX WEEKS. IT IS REQUESTED THAT THIS EXTENSION BE AUTHORIZED.

DONALD H. WOOLEY, 1/Lt, USAF
FTDTP
Project Engineer

H. A. HANES, Colonel, USAF
Director, Flight Test and Development

AF Technical Report No. AFFTC 54-16

COMDR AFFTC, EDWARDS AFB CALIFORNIA

COMDR WADC, WRIGHT-PATTERSON AFB OHIO 17 May 54

SUBJECT FLIGHT TEST OF PTI INSTALLATION IN F-86F.... TEST FLIGHTS OF THE AIR FORCE PHASE FOUR AND OPERATIONAL SUITABILITY TEST OF THE GENERAL ELECTRIC BAILMENT AIRCRAFT F-86F S/N 506 EQUIPPED WITH PRE-TURBINE INJECTION WERE COMPLETED 6 MAY 54. EIGHTEEN FLIGHTS HAVE BEEN MADE TOTALING THIRTEEN HOURS AND THIRTY MINUTES INCLUDING TWO HOURS PTI TIME. DURING THE FIRST FOUR FLIGHTS PTI OPERATION WAS NOT ENTIRELY SATISFACTORY BECAUSE OF BINDING OF THE NOZZLE AND/OR NOZZLE ACTUATOR ASSEMBLY. THIS CONDITION WAS ELIMINATED BY SUITABLE MODIFICATIONS AND THE FIFTH THROUGH THE TENTH FLIGHTS WERE MADE WITH PTI OPERATING SATISFACTORILY. ON THE ELEVENTH FLIGHT A TURBINE BUCKET FAILED. TIME ON THE BUCKETS WHEN FAILURE OCCURRED WAS TWO HOURS AND EIGHT MINUTES OF PTI TIME. THE TURBINE WHEEL WAS REPLACED AND PTI OPERATION WAS SATISFACTORY UNTIL FLIGHT EIGHTEEN WHEN ANOTHER TURBINE BUCKET FAILED. TIME ON THIS SET OF BUCKETS WAS ONE HOUR AND FORTY-THREE MINUTES. INFORMAL INFORMATION FROM THE GENERAL ELECTRIC COMPANY INDICATES THAT THE LONGEST TIME TO BE ACCUMULATED ON A SET OF TURBINE BUCKETS WAS TWO HOURS AND TWELVE MINUTES AT WHICH TIME A 1200°C START NECESSITATED THE REMOVEL OF THE TURBINE WHEEL. IT IS RECOGNIZED THAT THE PTI INSTALLATION HAS CONSIDERABLE MERIT BUT DUE TO THE RELATIVELY SHORT DURATION OF THE TEST IT IS DIFFICULT TO FULLY EVALUATE THIS SYSTEM. IT IS ANTICIPATED THAT ADDITIONAL TESTING WILL ELIMINATE THE DIFFICULTIES ENCOUNTERED. THE AFFTC RECOMMENDS THAT FURTHER DEVELOPMENTAL TESTING ON THE PTI INSTALLATION BE ACCOMPLISHED BOTH BY GENERAL ELECTRIC AND BY THE AIR FORCE. TO EXPEDITE THE PTI PROGRAM IT IS SUGGESTED THAT THE IN-SERVICE FUNCTIONAL DEVELOPMENT TEST BE RUN CONCURRENTLY WITH THE ABOVE TESTS. IT IS ALSO RECOMMENDED THAT THE IN-SERVICE TEST BE CONDUCTED UNDER STRICT TEST CONDITIONS WITH SUITABLE LIMITATIONS ON PTI OPERATION. THE FOLLOWING APPROXIMATED PERFORMANCE

DATA WERE OBTAINED FROM THE INSTRUMENT CORRECTED, RAW DATA WITH A GROSS TAKE-OFF WEIGHT OF 15,400 POUNDS. RATE OF CLIMB AT 20,000 FEET WAS INCREASED 6,500 FEET PER MINUTE WITH PTI AS COMPARED TO DRY OPERATION. THIS DELTA RATE OF CLIMB IS INDICATIVE OF THE INCREASE IN CLIMB PERFORMANCE THROUGHOUT THE 20,000 TO 45,000 FOOT ALTITUDE RANGE TO WHICH THIS PTI ENGINE CONFIGURATION IS LIMITED. AN AVERAGE TIME TO CLIMB FROM 20,000 TO 45,000 FEET WAS FOUR MINUTES WITH PTI. AT 40,000 FEET TIME TO ACCELERATE FROM MINIMUM TO MAXIMUM AIRSPEED WAS DECREASED FROM FOUR MINUTES TWENTY-TWO SECONDS TO ONE MINUTE FORTY SECONDS WITH PTI. AT 30,000 FEET AN .025 INCREASE IN MAXIMUM LEVEL FLIGHT MACH NUMBER WAS OBTAINED OVER DRY OPERATION. THE TEST PILOT REPORTS THAT ALTHOUGH PTI OPERATION DURING THE FIRST FOUR FLIGHTS WAS UNSATISFACTORY, PTI OPERATION DURING THE SUBSEQUENT FOURTEEN FLIGHTS WAS SIMPLE AND DEPENDABLE.

DONALD H. WOOLEY, 1/Lt, USAF
FTDTP
Project Engineer

H. A. HANES, Colonel, USAF
Director, Flight Test and Development

PRELIMINARY EVALUATION OF THE GENERAL ELECTRIC PRE-TURBINE INJECTION SYSTEM

A. PURPOSE

1. This report presents the results of a preliminary evaluation to determine the practicability and suitability of the General Electric Company's pre-turbine injection installation in an F-86F aircraft.

B. INTRODUCTION

1. The pre-turbine injection installation (hereafter referred to as PTI) was developed by the General Electric Company as a thrust augmentation system for the F-86F aircraft. The system is designed to give approximately 40% increased thrust and is restricted to altitudes between 20,000 and 45,000 feet.

2. Flight testing of the PTI system was authorized by WADC, and on 21 April 1954 a test program was initiated on the General Electric Company's bailment F-86F S/N 506. During the testing period of 21 April to 6 May 1954, eighteen test flights were made, accumulating 13:30 hours of flight time, approximately 2:00 hours of which was PTI time.

C. TEST RESULTS AND DISCUSSION

1. The following is a resume of the main difficulties encountered during the program:

a. During the first four flights PTI operation was unsatisfactory. On each of these flights PTI was started at 20,000 feet and did operate satisfactorily to 45,000 feet, however, attempts to relight PTI after the climb were unsuccessful. On those attempts where a light was made, a critical drop in engine speed resulted. It was determined that this drop in speed was caused by failure of the jet nozzle to open to the proper position. Investigation revealed several factors which may have prevented the jet nozzle from opening properly. After suitable modifications were made the operation of the PTI system was satisfactory. A list of the factors contributing to the binding of the nozzle and the modifications made, is as follows:

(1) Friction of the nozzle actuating arms at the nozzle actuating arm slots; friction was reduced by installing a nozzle body with surface hardened arm slots.

(2) Friction between the nozzle segments and the nozzle body; surface hardened nozzle segments were installed.

(3) Seizing of the nozzle jack shaft in the needle bearings at high temperatures; diameter of the jack shaft was decreased.

(4) Binding of the nozzle actuator motor brake due to absorption of oil by the surface of brake increased.

(5) Gumming of the nozzle jack shaft due to oil leakage. All sources of oil leakage to the assembly were eliminated.

b. On flight No. 10 PTI was started at 45,000 feet in a climb. The climb continued to 50,000 feet with PTI operating satisfactorily. AT 50,000 feet PTI was shut off and relighted satisfactorily using a "speed-jog" technique. To light PTI by the "speed-jog" method, a throttle setting of slightly less than full forward is established, immediately upon starting PTI the throttle is advanced to the full forward position. The climb was continued to 53,420 feet. At this altitude a loud noise and subsequent vibration caused the pilot to retard the throttle to idle. The aircraft was landed with the engine at idle speed. An inspection revealed that a single turbine bucket had failed.

c. On flight No. 11 difficulty was experienced in lighting and maintaining PTI. This was attributed to a low main engine fuel flow setting for PTI operation. The main engine fuel flow was increased and PTI operation was satisfactory in subsequent flights.

d. On flight No. 18 at 44,000 feet after being on PTI for approximately 13 minutes a loud noise and an aft fire warning light caused the pilot to cut off the engine and make a dead-stick landing. The amount of continuous PTI time accumulated during this flight was longer than on any previous flight. Inspection of the engine revealed another single turbine bucket failure. This was the last flight made under the Air Force test program.

2. a. A zyglo inspection of the two turbine wheels which suffered the bucket failures did not reveal any defects in the turbine wheel blanks. The maximum tip diameters were 34.334 and 34.322 inches, respectively. The first of these diameters exceeds the maximum allowable diameter of 34.325 for turbine wheels in standard use, however, for the PTI test the General Electric Company has tentatively increased the maximum print dimension to 34.385. The maximum blank diameters of the two turbine wheels were 26.736 and 26.744 inches respectively. The standard maximum blank diameter is 26.738 inches, on this basis the second turbine wheel was rejected. The buckets from the two turbine wheels have been sent by the General Electric Company to the Thompson Laboratory of the General Electric Company for analysis; the results are not yet available.

b. The PTI operation time accumulated by each set of buckets at the time of failure was 2 hours and 8 minutes and 1 hour and 43 minutes respectively. Informal information from the General Electric Company indicates that 2 hours and 12 minutes is the longest PTI time to ever be accumulated on one set of turbine wheel buckets.

3. The procedures for initial adjustment of the PTI system have not yet been finalized. At this time the PTI fuel flow is first adjusted on the ground to some predetermined value. The main fuel flow is then adjusted to be compatible with the PTI fuel flow, that is, to maintain a suitable pressure ratio between compressor discharge pressure and turbine discharge pressure so that PTI will start and operate satisfactorily. It is necessary to make very short duration PTI ground

runs and usually to make one or two test flights before the system is set up properly. This procedure is under study by the General Electric Company and it is likely that it will be modified.

4. During those flights when the PTI system was operating satisfactorily no difficulties were encountered in the operation of the system. Satisfactory PTI operation was demonstrated during all normally encountered aircraft maneuvers. The PTI system was started in climbs and dives and at both low and high airspeeds. Successful PTI lights are usually made on the first try using a normal starting procedure; while at 100% power momentarily pushing the throttle outboard to actuate a micro switch which starts the PTI. Use of the previously described speed-jog technique will almost always result in a satisfactory start should the normal starting procedure fail, providing the system is operating satisfactorily.

5. The General Electric Company has estimated that about 400 manhours would be required to modify an aircraft which is in service, to the PTI configuration. After installation of the final configuration of the PTI system the maintenance of the system proper is not expected to be excessive. Engine maintenance, however, due to the frequent inspections necessary and the short service life of the turbine wheel and buckets, will require a considerable number of manhours.

6. At this time the main disadvantages of the system are the short service life of turbine wheels and the maximum altitude limitation. The advantages are the increased performance of the aircraft, the simplicity of the system, and the easy adaptation of the system to great numbers of aircraft already in service.

D. CONCLUSIONS

1. At this time the General Electric Company's present PTI system has not been flight tested sufficiently for normal use by operational organizations. The system as tested could be utilized in F-86F aircraft with the following limitations:

a. Altitude: 20,000 to 45,000 feet.
b. Maximum continuous operation of PTI: 10 minutes.
c. Maximum PTI operation per flight: 10 minutes. (In order that frequent inspections can be made during the preliminary testing).
d. Maximum service life of turbine wheel buckets: 2 hours of PTI time.
e. Time between zyglo inspection of turbine wheels and hot section inspection of engines: 1 hour of PTI time.
f. Maximum turbine wheel tip and blank diameters: to be as specified in applicable Technical Orders.

2. Before being placed in operational organizations the PTI system should undergo a functional development test and further evaluation by an Air Force Flight Test organization. This test should be authorized as soon as possible in order that a fully developed PTI system be available in case of national emergency.

3. The PTI system possesses considerable potential and should be further developed by the General Electric Company.

E. RECOMMENDATIONS

1. The following actions are recommended in order to complete the development of the PTI system:

a. Continuation of the General Electric Company's flight test program at Edwards Air Force Base in order to improve the present PTI system, with emphasis on increasing the maximum altitude and increasing the service life of the turbine buckets.

b. Authorization of a functional development test and evaluation of the present PTI system by the Air Force. This test would be primarily an evaluation of the capabilities and limitations of the present PTI system and would provide information to be used in the development of an improved system. The following problems should be given particular consideration:

(1) Service life of the turbine wheel and hot section parts under PTI operation.

(2) Effect of continuous long duration PTI operation at various altitudes.

(3) Allowable altitudes for PTI operation.

(4) Effect of PTI operation on the structure of the tail cone, tailpipe and aircraft fuselage.

(5) Determination of turbine bucket temperatures through the use of an instrumented nozzle diaphragm.

(6) Determination of maximum allowable turbine wheel tip diameter and turbine wheel blank diameter for PTI operation.

(7) Investigation of the adaptation of the free floating shroud ring assembly to the PTI installation to reduce the possibility of shroud seizure.

2. Because of the potential of the PTI system and the advantages of this system it is recommended that further development and flight testing be authorized as soon as possible.

WILLIAM D. MOTZNY, 1/Lt, USAF
Project Engineer

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE OHIO

FEB 19 2002

MEMORANDUM FOR DTIC/OCQ (ZENA ROGERS)
8725 JOHN J. KINGMAN ROAD, SUITE 0944
FORT BELVOIR VA 22060-6218

FROM: AFMC CSO/SCOC
4225 Logistics Avenue, Room S132
Wright-Patterson AFB OH 45433-5714

SUBJECT: Technical Reports Cleared for Public Release

References: (a) HQ AFMC/PAX Memo, 26 Nov 01, Security and Policy Review, AFMC 01-242 (Atch 1)

(b) HQ AFMC/PAX Memo, 19 Dec 01, Security and Policy Review, AFMC 01-275 (Atch 2)

(c) HQ AFMC/PAX Memo, 17 Jan 02, Security and Policy Review, AFMC 02-005 (Atch 3)

1. Technical reports submitted in the attached references listed above are cleared for public release in accordance with AFI 35-101, 26 Jul 01, *Public Affairs Policies and Procedures*, Chapter 15 (Cases AFMC 01-242, AFMC 01-275, & AFMC 02-005).

2. Please direct further questions to Lezora U. Nobles, AFMC CSO/SCOC, DSN 787-8583.

Lezora U. Nobles

LEZORA U. NOBLES
AFMC STINFO Assistant
Directorate of Communications and Information

Attachments:
1. HQ AFMC/PAX Memo, 26 Nov 01
2. HQ AFMC/PAX Memo, 19 Dec 01
3. HQ AFMC/PAX Memo, 17 Jan 02

cc:
HQ AFMC/HO (Dr. William Elliott)

DEPARTMENT OF THE AIR FORCE

HEADQUARTERS AIR FORCE MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE OHIO

DEC 19 2001

MEMORANDUM FOR HQ AFMC/HO

FROM: HQ AFMC/PAX

SUBJECT: Security and Policy Review, AFMC 01-275

1. The reports listed in your attached letter were submitted for security and policy review IAW AFI 35-101, Chapter 15. They have been cleared for public release.

2. If you have any questions, please call me at 77828. Thanks.

JAMES A. MORROW
Security and Policy Review
Office of Public Affairs

Attachment:
Your Ltr 18 November 2001

18 December 2001

MEMORANDUM FOR: HQ AFMC/PAX
Attn: Jim Morrow

FROM: HQ AFMC/HO

SUBJECT: Releasability Reviews

1. Please conduct public releasability reviews for the following attached Defense Technical Information Center (DTIC) reports:

   a. *Emergency Fuel Selector Valve Test on the J47-GE-27 Engine as Installed on F-86F Aircraft*, January 1955; DTIC No. AD- 056 013.

   b. *Phase II Performance and Serviceability Tests of the F-86F Airplane USAF No. 51-13506 with Pre-Turbine Modifications*, June 1954; DTIC No. AD- 037 710.

   c. *J-47 Jet Engine Compressor Failures*, 7 April 1952; DTIC No. AD- 039 818.

   d. *Evaluation of Aircraft Armament Installation (F-86F with 206 RK Guns) Project Gun-Val*, February 1955; DTIC No. AD- 056 763.

   e. *A Study of Serviced-Imposed Maneuvers of Four Jet Fighter Airplanes in Relation to Their Handling Qualities and Calculated Dynamic Characteristics*, 15 August 1955; DTIC No. AD- 068 899.

   f. *Fuel Booster Pump*, 6 February 1953; DTIC No. AD- 007 226.

   g. *Flight Investigation of Stability Fix for F-86F Aircraft*, 8 September 1953; DTIC No. AD- 032 259.

   h. *Investigation of Engine Operational Deficiencies in the F-86F Airplane*, June 1953; DTIC No. AD- 015 749.

   i. *Operational Suitability Test of the T-160 20mm Gun Installation in F-86F-2 Aircraft*, 29 April 1954; DTIC No. AD- 031 528.

   j. *Engineering Evaluation of Type T 160 Gun and Installation in F 86 Aircraft*, September 1953; DTIC No. AD- 019 809.

k. *Airplane and Engine Responses to Abrupt Throttle Steps as Determined from Flight Tests of Eight Jet-Propelled Airplanes*, September 1959; DTIC No. AD-225 780.

l. *Improved F-86F: Combat Developed*, 28 January 1953; DTIC No. AD- 003 153.

m. *Flight Test Progress Report No. 19 for Week Ending February 27, 1953 for Model F-86F Airplane NAA Model No. NA-191*, 5 March 1953; DTIC No. AD-006 806.

2. These attachments have been requested by Dr. Kenneth P. Werrell, a private researcher.

3. The AFMC/HO point of contact for these reviews is Dr. William Elliott, who may be reached at extension 77476.

JOHN D. WEBER
Command Historian

13 Attachments:
a. DTIC No. AD- 056 013
b. DTIC No. AD- 037 710
c. DTIC No. AD- 039 818
d. DTIC No. AD- 056 763
e. DTIC No. AD- 068 899
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